

ENVIRONMENTAL ASSESSMENT BOARD



ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARINGS

VOLUME: 69


DATE: Thursday, October 3, 1991

BEFORE:

HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

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ENVIRONMENTAL ASSESSMENT BOARD
ONTARIO HYDRO DEMAND/SUPPLY PLAN HEARING

IN THE MATTER OF the Environmental Assessment Act,
R.S.O. 1980, c. 140, as amended, and Regulations
thereunder;

AND IN THE MATTER OF an undertaking by Ontario Hydro
consisting of a program in respect of activities
associated with meeting future electricity
requirements in Ontario.

Held on the 5th Floor, 2200
Yonge Street, Toronto, Ontario,
on Thursday, the 3rd day of October,
1991, commencing at 10:00 a.m.

VOLUME 69

B E F O R E :

THE HON. MR. JUSTICE E. SAUNDERS	Chairman
DR. G. CONNELL	Member
MS. G. PATTERSON	Member

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1 --On resuming at 10:03 a.m.

2 THE REGISTRAR: Please come to order This
3 hearing is now in session. Be seated, please.

4 THE CHAIRMAN: Mr. Shepherd?

5 MR. SHEPHERD: Mr. Chairman, I am not
6 used to starting the day without some submissions by
7 somebody on something. I am not sure I am quite ready
8 yet. (laughter)

9 KEITH DOUGLAS BROWN,
10 PAUL FRANK VYROSTKO,
JOHN KENNETH SNELSON; Resumed.

11 CROSS-EXAMINATION BY MR. SHEPHERD (cont'd):

12 Q. Mr. Vyrostko, returning to the
13 heading of projections, I expect we will spend all day
14 today and most of the day Monday on projections. I
15 just want to ask a number of questions generally about
16 your projections and then we will talk about the
17 specific ones.

18 THE CHAIRMAN: Perhaps a question I
19 shouldn't be asking. What do you mean by projections?

20 MR. SHEPHERD: The forecasts. Actually,
21 maybe I should try to discipline myself to use that
22 word because it will become important later what the
23 difference is.

24 Q. I guess, Mr. Vyrostko, it's fair to
25 say that Hydro's history of NUG projections hasn't been

1 much to be proud of, has it?

2 MR. VYROSTKO: A. It depends on what we
3 mean by being proud of. If you are suggesting that
4 they have changed from year to year, then I would agree
5 that they have changed from year to year.

6 Q. In 1987 isn't it true that Hydro
7 insisted that it would only get 300 megawatts of NUGs
8 by the year 2000?

9 A. I believe so.

10 Q. And then, I take it under fairly
11 serious pressure from the government, Hydro increased
12 its projection in 1988 to 1,000?

13 A. I don't believe it was as a result of
14 the government pressure. I think it was corporation
15 raising the number.

16 Q. It was true at that time that the
17 industry and the government were both saying publicly
18 that your projections were too low; isn't that correct?

19 A. I am not aware of that.

20 Q. That was before your time in this
21 area?

22 A. It was.

23 Q. Okay. You started being involved in
24 non-utility generation in 1989; is that right?

25 A. August of '88.

1 Q. August of '88, okay. That was just
2 after the 1,000 megawatt projection?

3 A. That's correct.

4 Q. Okay. So then at that time when you
5 had the 1,000 megawatts, it's my understanding, correct
6 me if I am wrong, that the Ministry of Energy was
7 arguing that it should be 2,000 megawatts and the
8 industry was in fact saying publicly it should be 3,500
9 megawatts; is that roughly right?

10 A. I think there was a period of time
11 there when different people had different expectations
12 of what non-utility generation can be, that's correct.

13 Q. And are we talking the right ranges
14 here, the numbers in the right ranges?

15 A. I know that the government was
16 talking 2,000 megawatts.

17 Q. You don't recall the industries'
18 suggestions as to what the numbers should be?

19 A. I don't.

20 Q. Mr. Vyrostk, didn't negotiations
21 take place between Ontario Hydro and the government in
22 1989 that lead to the Ministry changing its target from
23 2,000 megawatts overall to 1,000 megawatts in 1995, and
24 a further 1,000 megawatts by the year 2000 with Hydro
25 agreeing that it would ensure that its forecast was at

1 least 1,600 megawatts; didn't those negotiations in
2 fact take place?

3 A. That's not how the negotiations took
4 place at all. In fact, I don't think there were
5 negotiations. There were discussions with respect to
6 what the Ministry had with regard to the forecast. And
7 at that time we were heavily involved in the
8 development of the first 1989 NUG plan which started
9 early in 1989, it was going through the summer of '89,
10 and I don't think it was negotiations, it was just
11 discussions and they developed their forecast and we
12 developed ours.

13 Q. Will you confirm that the Ministry of
14 Energy at that time was Robert Wong?

15 A. Yes.

16 Q. Was it your evidence that Mr. Wong
17 and Mr. Franklin and yourself did not have any
18 negotiations as to what the respective forecasts and
19 projections would be?

20 A. We did not.

21 Q. Now, is it fair to say that the 1989
22 NUG plans was your first real attempt to do a
23 disciplined analysis of how much you would get for
24 non-utility generation?

25 A. Yes.

1 Q. Now, since then you have rejected
2 some of the analytical techniques you used to arrive at
3 that first number; right? You decided to approach some
4 things differently, better ways of doing it?

5 A. I think probably a lot of these
6 questions I should probably ask the forecaster, Mr.
7 Brown, to be able to address because those are some of
8 the details of the forecasting process, so I can't
9 answer that last question.

10 Q. Okay. Mr. Brown?

11 MR. BROWN: A. The '89 forecast was our
12 first NUG plan and we were continuing to improve each
13 plan.

14 Q. And did you make some changes to your
15 approaches and techniques, analytical techniques and
16 the basis of your numbers between the 1989 plan and the
17 1990 plan?

18 A. Yes, we did.

19 MR. SNELSON: A. Perhaps I could just
20 add, Mr. Shepherd, that there were analyses of NUG
21 potential and projections that preceded the 1989 NUG
22 plan which were done in the system planning division as
23 part of demand/supply option study around '85/86, and
24 those were the basis for the 300 number that you first
25 discussed, and those projections were based upon

1 natural gas prices that were in effect prior to 1985,
2 prior to a very large drop in oil and gas prices around
3 1985 which is the main reason for them being
4 substantially lower than the current projections.

5 Q. Do I understand you to be disagreeing
6 with Mr. Vyrostko's answer that the 1,635 was the first
7 disciplined analysis?

8 A. Well, that was the first disciplined
9 analysis that was done by the NUG division because the
10 NUG division was a newly created organization at that
11 time.

12 I am just indicating that there was
13 disciplined analyses within the system planning
14 division which is in evidence in exhibits in this
15 hearing that preceded that.

16 Q. So we will see an analysis, if we
17 looked at the demand/supply options, is it DSOS or
18 DSPS?

19 A. In the demand/supply option study.

20 Q. Demand/supply option study. So, if
21 we look in there, we will see an analysis of various
22 technologies of technical potential and achievable
23 potential and all of that like we see in the NUG plan?

24 A. Yes. Probably not to quite the same
25 degree of detail, but parallel in many respects.

1 Q. And it produces a 300 number?

2 A. Yes.

3 DR. CONNELL: Can we have the exhibit
4 number for the record?

5 MR. SHEPHERD: I think there are quite a
6 number of them, Dr. Connell.

7 MR. SNELSON: The umbrella exhibit that
8 covers the data at that time is Exhibit 66, which is
9 Meeting Future Energy Needs, Draft Demand/Supply
10 Planning Strategy, December 1987.

11 The analysis that was in there on the
12 options preceded that. There are various background
13 reports to that, and so I would have to dig through and
14 find the right one to cover that off.

15 MR. SHEPHERD: Q. I wonder if you could
16 undertake to identify where that analysis of the 300
17 number is and let us know?

18 MR. SNELSON: A. Yes, I will.

19 THE REGISTRAR: That will be 322.5.

20 ---UNDERTAKING NO. 322.5: Ontario Hydro undertakes to
21 provide where that analysis of the 300
number can be found.

22 MR. SHEPHERD: Sorry, Dr. Connell, I'm
23 sorry, did I interrupt?

24 DR. CONNELL: No.

25 MR. SHEPHERD: Q. And do I understand

1 you to be saying that the sole significant reason why
2 the 300 number is so much lower than the current
3 numbers is the change in gas prices; is that right?

4 MR. SNELSON: A. That is the biggest
5 reason. There may be others.

6 Q. Would we also find that your previous
7 analysis didn't include a whole lot of technologies?

8 A. I don't believe it included turbo
9 expanders, I don't believe that it included the use of
10 waste heat in gas compressor stations. Those are two
11 that I can recall in the present analysis that weren't
12 in that analysis.

13 Q. Maybe it's easier when we look at it,
14 we will see.

15 Is it going to take you long to find
16 where that is, do you think? I am just wondering it's
17 something you can do at lunch or over the weekend so we
18 can deal with it?

19 A. I believe that we could have those
20 references by Monday.

21 Q. Thank you.

22 Now, Mr. Vyrostk, is it fair to say that
23 even when the increase to 1,635 or 16 -- actually 1,661
24 fairly, right? 1,661 was your number in 1989?

25 MR. BROWN: A. That's correct.

1 Q. Even with that increase, is it fair
2 to say that you were heavily criticized both by
3 government and the industry for that number as being
4 too low?

5 MR. VYROSTKO: A. I believe some people
6 thought it was too low.

7 Q. And haven't you responded to those
8 criticisms publicly on many occasions by saying that
9 that number is not a target or a goal, but a forecast
10 and thus is a floor rather than a ceiling?

11 [10:43 a.m.]

12 A. That's correct.

13 Q. And is it true that despite the
14 criticisms, the Demand/Supply Plan, including decisions
15 to seek approval for the Manitoba purchase, hydraulic,
16 nuclear, et cetera, is based on your assurance that the
17 1,661 is the correct number?

18 A. I believe that the plan was put
19 together in 1989 on that basis and that at that time
20 1635 -- or 1661 was what we believed could be economic
21 within the context of all the assumptions at that time.

22 Q. And, Mr. Snelson, - I mean, this is
23 almost too basic to ask - but just to confirm that the
24 Demand/Supply Plan major supply options, including
25 Manitoba, large hydro and nuclear, those major supply

1 options rest on a foundation of 1,661 megawatts of
2 NUGs; right?

3 MR. SNELSON: A. Yes, they rest on that
4 as being a median estimate, recognizing that the number
5 could be higher or lower.

6 Q. You didn't have a bandwidth for that;
7 did you?

8 A. We did not define the bandwidth,
9 though we did discuss in the Demand/Supply Plan,
10 Exhibit 3, we did discuss the consequences of higher or
11 lower quantities of non-utility generation and demand
12 management and there are references in there that
13 higher quantities of those options would cause the plan
14 to look more like the low load growth path and lower
15 quantities would cause the plan to look more like the
16 high load growth path.

17 Q. And is it fair to say that in those,
18 what would you call them, sensitivity discussions if
19 you like or flexibility discussions?

20 A. That's a fair description.

21 Q. That you weren't contemplating that
22 you would have to face a number of 3,100 megawatts of
23 NUGs?

24 A. We hadn't put a specific number on
25 it. The flexibility that was being provided for load

1 growth was of the order of plus or minus 5,000
2 megawatts and the judgment was that the flexibility for
3 different levels of load growth provided flexibility
4 for different levels of non-utility generation or
5 demand management.

6 Q. So does that mean that implicit in
7 how you designed the plan was that you could take 6,661
8 megawatts of NUGs because you had that 5,000 cushion?

9 A. Not specifically.

10 Q. You didn't actually look at how much
11 more NUGs you could take?

12 A. We were aware that we had designed a
13 plan that could follow wide variations in load growth
14 and that that would inherently provide flexibility to
15 provide variations in demand management and non-utility
16 generation of the same general order of magnitude, but
17 not specifically to say all of that flexibility should
18 be used by NUGs, or all of that flexibility should be
19 used by demand management.

20 Q. You're actually being pushed to the
21 limit of that 5,000 with the combination right now;
22 aren't you? The combination of factors is now pushing
23 you pretty close; isn't it?

24 A. No, I don't believe we used all that.

25 Q. Okay. I realize you're preparing an

1 integration document and I will be able to go into this
2 in detail then. Perhaps I'll just leave it there.

3 Back to you, Mr. Vydrostko. Last year
4 then you came up with a new number 2,107; right?

5 MR. BROWN: A. That's correct.

6 Q. Okay. Did you not want to answer
7 because you don't know that that's the right number,
8 Mr. Vydrostko?

9 MR. VYROSTKO: A. No, I could have
10 answered that as well.

11 Q. Thank you. Now, is it true, Mr.
12 Vydrostko, that at that time when you made the 2,107
13 megawatt projection, you had before you in-service
14 committed and proposed projects totalling - and I'm
15 deducting double counting - totalling something in
16 excess of 7,000 megawatts?

17 A. That's correct.

18 Q. And, again, at that time both the
19 government and the industry criticized your number as
20 being far too low; is that correct?

21 A. I don't believe the government
22 criticized that number as being too low.

23 Q. Didn't the Minister of Energy stand
24 up in the House -- in the Legislature and say: We can
25 get more from cogeneration than Ontario Hydro is

1 currently projecting. Isn't that what she said?

2 A. Currently projecting 1,600 megawatts.

3 Q. Sorry.

4 A. You're referring to the 1,600
5 megawatts?

6 Q. No, 2,100. I'm talking about
7 November, 1990.

8 A. I believe she said that, that's
9 correct.

10 Q. But you insisted that your 2,100
11 megawatts was the correct number?

12 A. At the time when we did our plan,
13 which was back in sort of the summer and the fall of
14 last year, that was the number that we felt was
15 reasonable.

16 Q. And now you're telling us the correct
17 number is 3,100 megawatts?

18 A. We're not saying it's the correct
19 number, what we're saying is that that's the
20 expectation that we feel can materialize by the year
21 2000.

22 Q. Maybe I shouldn't have used the word
23 correct, that's unfair. It's the appropriate number to
24 use for planning purposes at this hearing?

25 A. That's the number that we provide to

1 our corporation for planning for non-utility
2 generation, that's correct.

3 Q. Okay. Now, is that number still, as
4 you said in 1989, a forecast rather than a target or a
5 goal?

6 A. That's correct, it's an expectation
7 of what we believe can happen under the circumstances
8 that were there when we put it together.

9 Q. Now, my recollection of your
10 description of forecasts, that I've heard you say, is
11 that a forecast means that's what the corporation is
12 relying on you to produce, and so you have to produce
13 it. Is that a fair characterization?

14 A. I don't think so. A forecast from
15 our perspective -- or from my perspective is sort of an
16 expectation based on current information as to what we
17 think all of our activities and our programs will do.

18 Q. Mr. Vyrostk, I asked you just a
19 minute ago whether you had said, with respect to your
20 earlier number, that it was a forecast which meant a
21 floor rather than a ceiling.

22 Is your current number a forecast which
23 means a floor rather than a ceiling?

24 A. At some point in time my concern is
25 that the assumptions that go into putting the plan

1 together will start heading in a direction that is in
2 reverse to the direction that we see now.

3 And so where, because of the trends, the
4 indications always seem to suggest that, you know,
5 things might in fact become better, the reverse might
6 occur.

7 So I can't say today that it's either a
8 floor or a ceiling. Next year it may be either up or
9 down.

10 Q. So that's somewhat of a change from
11 your previous explanation then?

12 A. It's just that -- it's a change in
13 terms of what I have seen in the last three years with
14 all of the indicators out in the industry.

15 Q. Do you, in your division, consider it
16 your responsibility to deliver that number and more, if
17 you can?

18 A. Yes.

19 THE CHAIRMAN: I know you're going to get
20 to this, but that's subject to integration matters; is
21 it not?

22 MR. VYROSTKO: I assume that in all of
23 the discussions that we're talking about here, that's a
24 given, that's correct.

25 THE CHAIRMAN: Well, I think it's an

1 important given, because you've just said 'meet the
2 expectations or more if you can', and I would have
3 thought, based on the evidence up to now, that that
4 would be subject to integration.

5 MR. VYROSTKO: That's correct, it is
6 subject to integration, yes.

7 MR. SHEPHERD: Q. So, is it fair to say
8 that in the integration exercise the system planning
9 department could say: Sorry, we can't 3,100 megawatts
10 we can only take 2,200 megawatts, so that's your limit?

11 MR. VYROSTKO: A. That wouldn't happen
12 after the fact. As part of the forecasting process,
13 one of the important elements is, in fact, to see
14 whether there is sufficient capacity on the system to
15 accommodate any of the numbers that we could be looking
16 at.

17 Q. So when you say the 3,100 megawatts
18 is subject to the integration process, all that means
19 is that it may -- you may not be able to take more than
20 that if the integration process says we can't take any
21 more?

22 A. Part of the integration process is
23 reflecting through the avoided cost what is economic to
24 the non-utility generation, and so once the system
25 reaches a point where there is adequate capacity, then

1 the value of non-utility -- additional non-utility
2 generation starts to fall because there's no capacity
3 credit, and so the integration and the pricing are
4 interrelated.

5 Q. Mr. Vyrostkco, when you published the
6 1990 NUG plan, is it fair to say that you recognized
7 that it was based on somewhat limited information and
8 might be somewhat inaccurate?

9 A. No.

10 Q. Well, I'm going to ask you to look at
11 the 1990 NUG plan, at page Roman Numeral 7.

12 THE CHAIRMAN: What's that exhibit
13 number, please, Mr. Shepherd?

14 MR. SHEPHERD: That's Exhibit 83, Mr.
15 Chairman.

16 THE CHAIRMAN: Thank you.

17 [10:25 a.m.]

18 MS. PATTERSON: What's the page number
19 again?

20 MR. SHEPHERD: It is Roman numeral 7.

21 Q. And the last complete paragraph
22 there, Mr. Vyrostkco, before the chart, says:

23 It is assumed that as the industry
24 matures and grows the resulting projects
25 will produce more accessible data for

1 future forecasting purposes. As an
2 annual document the NUG plan will track
3 these changes and trends. In this regard
4 the NUG plan's accuracy and value can
5 only improve as the industry matures.

6 Is that not intended to say that you
7 recognize that you have got some limitations in here?

8 MR. VYROSTKO: A. I think the plan that
9 was put together is probably as good a plan as anyone
10 can produce with the information that's there, so I am
11 not suggesting that the plan was inaccurate or
12 incomplete. At the time it was produced it was as good
13 a plan as we could produce.

14 Q. It is true that it was based on quite
15 limited information in some cases?

16 A. It was based on all the information
17 that was available to us.

18 Q. And didn't we hear Mr. Brown say
19 yesterday that some of the information that he has been
20 working with is very limited?

21 Mr. Brown, is that correct, you were
22 working with limited information?

23 MR. BROWN: A. In some areas that's
24 true.

25 Q. And limited information generally

1 implies inaccuracies or weakness of the conclusions,
2 doesn't it? Is that a fair generalization?

3 MR. VYROSTKO: A. It may in some cases;
4 it may not in other cases.

5 Q. All right. I am going to ask you to
6 turn to --

7 DR. CONNELL: Sorry, Mr. Shepherd. What
8 was the page reference?

9 MR. SHEPHERD: That is Roman numeral 7,
10 v-i-i. It is in the little introductory section.

11 Q. If I can find it, I am going to ask
12 you to turn, Mr. Vyrostko, to Exhibit 319, the
13 supplementary witness statement.

14 If you turn to page 6, paragraph 22 --
15 and this was covered in your direct evidence, too.
16 It's just this is a more convenient reference.

17 Paragraph 22 lists the four types of
18 information that you rely on now, I guess, to make
19 forecasts, and actually maybe this is for Mr. Brown. I
20 wonder if we could just go through those sources of
21 information.

22 THE CHAIRMAN: Just hold for a moment
23 until we get organized here.

24 MR. SHEPHERD: Sorry. It's Exhibit 319.

25 THE CHAIRMAN: Page 6? Is that where we

1 are at?

2 MR. SHEPHERD: Page 6, paragraph 22.

3 THE CHAIRMAN: Paragraph 22?

4 DR. CONNELL: All right. Thank you.

5 MR. SHEPHERD: Q. So, Mr. Brown, let's
6 start with resource assessments. I heard from your
7 direct evidence on Tuesday that resource assessments
8 are basically lists of sites; correct?

9 MR. BROWN: A. In some technologies
10 that's correct.

11 Q. Let's just stick with that component
12 for a second, and we will get back to it. When we
13 looked around for resource assessments of that type,
14 just lists of sites, we found a list of hydraulic
15 sites.

16 A. Yes.

17 Q. And the Leighton and Kidd study,
18 which is a list of cogen sites?

19 A. Yes.

20 Q. Are there others? Are there other
21 resource assessments other than those two?

22 A. The Seawright study.

23 THE CHAIRMAN: I'm sorry, what study?

24 MR. BROWN: The updated steam survey done
25 in 1988, which is referenced in the NUG plan.

1 MR. SHEPHERD: Q. That is the Terry
2 Seawright Associates study?

3 MR. BROWN: A. That's right.

4 Q. Is that the only other one?

5 A. To estimate the gas compressor
6 stations requires a site-by-site analysis.

7 Q. And you did one?

8 A. I have one.

9 Q. Is that filed?

10 A. It's confidential information. The
11 results of that information are in the NUG plan.

12 THE CHAIRMAN: It's broken out in the NUG
13 plan?

14 MR. BROWN: The aggregated information is
15 included in the NUG plan.

16 MR. SHEPHERD: But the actual --

17 THE CHAIRMAN: But it is the reference to
18 gas compression sites specifically, though, is it?
19 When you say "aggregate information" I am not quite
20 sure what you mean by that.

21 MR. BROWN: Based on discussions with
22 proponents we looked at all the sites in Ontario that
23 had potential.

24 THE CHAIRMAN: You are talking about gas
25 compression sites now?

1 MR. BROWN: That's correct. And of
2 those, the total number is in the NUG plan.

3 MR. SHEPHERD: Q. So all that is in the
4 NUG plan is the total. There is no indication of the
5 resource assessment in the NUG plan?

6 MR. BROWN: A. There is no site
7 information.

8 THE CHAIRMAN: Can you give me the total
9 figure, what you are talking about, what the total
10 was - just in rough terms? Ballpark?

11 MR. BROWN: 240 to 300 megawatts.

12 MR. SHEPHERD: Q. Now, those lists of
13 sites, they don't actually assess the technical
14 potential for electricity, do they?

15 MR. BROWN: A. Some do.

16 Q. Which ones?

17 A. Hydraulic assessment.

18 Q. Well, but am I right that you haven't
19 used the total in the hydraulic assessment as your
20 technical potential number?

21 A. I have excluded some portions of it.

22 Q. Okay. And that's the only one that
23 actually is an assessment of the electricity resource,
24 isn't it?

25 A. They're all assessments.

1 Q. Well, it's the only one that talks
2 about how much electricity you will get, isn't it?

3 A. It's the only public document, yes.

4 Q. Other than the gas compressor
5 information do you have some other resource assessments
6 that are not public documents?

7 A. To calculate the wood waste and
8 natural gas component, that is based on project
9 information as well.

10 Q. So you have a resource assessment, a
11 list of all potential sites for wood waste generation?

12 A. No, I don't.

13 Q. So then that isn't under resource
14 assessment; it's under project information?

15 A. To calculate technical potential with
16 the combination of gas I have to understand what
17 proponents are doing with the wood waste. That's why
18 the potential increased in that area.

19 Q. But we are just talking about
20 resource assessments now. You don't have a resource
21 assessment for wood waste?

22 A. Not site by site.

23 Q. Well, do you have any resource
24 assessment for wood waste?

25 A. Yes, it's referenced in the NUG plan.

1 Q. And what is it?

2 A. It's reference No. 1 in the 1990 NUG
3 plan, "Energy From Waste, a Canadian Perspective".

4 Q. But that's just a speech, isn't it?

5 A. It is a compilation of various
6 sources.

7 THE CHAIRMAN: Are you reading from the
8 NUG plan now? What page are you at?

9 MR. BROWN: Page 18.

10 MR. SHEPHERD: Q. I just want to make
11 this absolutely clear.

12 Reference No. 1 on page 18 of the 1990
13 NUG plan, you are referring to that as a resource
14 assessment for waste; is that correct?

15 MR. BROWN: A. It provides waste
16 information, and the number that is used in the 1990
17 NUG plan comes from a table in that report.

18 Q. All right. Have you filed that? Is
19 that around somewhere?

20 A. It's provided in several
21 interrogatories.

22 Q. I wonder if you could find one of the
23 references - maybe not right now; just at the break -
24 so that we can make sure everybody has had a chance to
25 look at that resource assessment.

1 A. I can give you the interrogatory
2 right now.

3 Q. Oh, can you? Okay.

4 A. In your particular case, 5.14.228.

5 Q. Yes. 5.14.228 has all of these
6 references in it?

7 A. That's correct.

8 Q. Well...

9 THE REGISTRAR: That will be 321.13.

10 ---EXHIBIT NO. 321.13: Interrogatory No. 5.14.228.

11 MR. SHEPHERD: Q. So are there any other
12 resource assessments?

13 MR. BROWN: A. You are looking site by
14 site or in general?

15 Q. Well, you use the term "resource
16 assessments" there.

17 A. Yes.

18 Q. It says that's a source of
19 information, resource assessments, and I am asking you
20 to --

21 A. Well, your question was directed at
22 site by site and you said you would come back to the
23 general stuff later.

24 Q. Sorry? Oh. No, I will come back to
25 the question of what constitutes a resource assessment

1 later.

2 THE CHAIRMAN: I think what Mr. Shepherd
3 wants to know is: What are the resource assessments
4 you used to develop and estimate the forecast? That's
5 with reference to paragraph 22.

6 Now, have you referred to them all or are
7 there some others?

8 MR. BROWN: There is one more.

9 MR. SHEPHERD: Q. Which is...?

10 MR. BROWN: A. Reference No. 4 in the
11 1990 NUG plan.

12 Q. Okay.

13 THE CHAIRMAN: And that is what, please?

14 MR. BROWN: "Cogeneration Potential in
15 Ontario and Barriers to its Development."

16 MR. SHEPHERD: Q. Is it correct to say
17 that is also attached to 5.14.228, or it is filed
18 separately perhaps?

19 MR. BROWN: A. No, all references are in
20 the same interrogatory.

21 Q. Well, no. Actually, I am just
22 reading -- well, maybe I am wrong.

23 Reference No. 4 in the 1990 NUG plan,
24 your response to the interrogatory is: Please contact
25 Ministry of Energy for a copy.

1 A. All right. It's probably filed in
2 another interrogatory then.

3 Q. You wouldn't give it to us, but you
4 gave it to somebody else?

5 [10:35 a.m.]

6 A. At the time we did that one, we
7 didn't have any copies available.

8 Q. Okay. Will you undertake to find out
9 where it is and to file it as an exhibit, please.

10 MR. B. CAMPBELL: That is fine.

11 THE REGISTRAR: That will be 322.6.

12 ---UNDERTAKING NO. 322.6: Ontario Hydro undertakes to
13 provide reference No. 4 to the 1990 plan,
Exhibit 83.

14 MR. SHEPHERD: Q. Now, I understand your
15 definition of a resource assessment to be a list of
16 sites; is that correct?

17 MR. BROWN: A. In some technologies.

18 Q. And in other technologies it's what?

19 A. As I mentioned in my direct, some
20 technologies we do not know sites, we only know volume,
21 such a as wood waste or municipal solid wastes. In
22 that particular case we just know in general how much
23 is available for production in Ontario, we don't really
24 know where.

25 Q. The next item of information then

1 is - I am still in 319, page 6, paragraph 22 - economic
2 analysis. We have already seen some of your
3 spreadsheets, we talked about them yesterday, and there
4 are spreadsheets for combined cycle that you have
5 tabled. Aside from those, are there any other economic
6 analysis relied on by Hydro in these forecasts?

7 A. That is the only technology where
8 that is used.

9 Q. So, the industrial cogeneration, the
10 three spreadsheets we see in the 1990 NUG plan as
11 amended, and the spreadsheets attached to Interrogatory
12 5.14.214?

13 A. That's correct.

14 Q. On combined cycle. Those are the
15 only economic analyses you have done?

16 A. That's correct.

17 MR. SHEPHERD: Mr. Chairman, 5.14.214 has
18 not been referred to yet.

19 THE CHAIRMAN: 5.14.214?

20 MR. SHEPHERD: Yes.

21 THE CHAIRMAN: That would be a new number
22 then, please.

23 THE REGISTRAR: 321.14.

24 ---EXHIBIT NO. 321.14: Interrogatory No. 5.15.214.

25 MR. SHEPHERD: Q. The next is project

1 development information. I take it from your earlier
2 comments that all of that information is confidential
3 and cannot be disclosed to this Board?

4 MR. BROWN: A. No. Some of that
5 information has already been provided but in an
6 aggregate form.

7 Q. All right. That is, you have already
8 taken the information and formed conclusions on it and
9 provided the conclusions?

10 A. In some cases we provided the
11 conclusions, in other cases we provided the raw
12 data, like we provided the in-service hydraulic
13 committed proposed numbers. Actually, for every
14 technology we do that.

15 Q. But isn't it true, Mr. Brown, that
16 the key project development information that affects
17 your plan is the proposed cogen and major supply NUG
18 projects? That's the one that's most affecting you
19 right now; right?

20 A. That's correct.

21 Q. And all of that is confidential;
22 correct?

23 A. On a site by site basis, yes.

24 Q. Is there some part of that batch of
25 information that is not confidential?

1 A. I can give you the total.

2 Q. No, we have the total already.

3 THE CHAIRMAN: I take the total broken
4 down in various categories; is that right?

5 MR. BROWN: That can be provided as well.

6 MR. SHEPHERD: Q. Do we have that
7 already, or is this new?

8 MR. BROWN: A. I don't know if we have
9 broken down each individual technology. Usually we
10 provide the information in hydraulic cogeneration and
11 other thermal.

12 Q. But you can break it down exactly
13 into each of the categories in your NUG plan?

14 A. That's correct.

15 Q. Do you have that?

16 A. I can provide that.

17 MR. SHEPHERD: Maybe we could get an
18 undertaking for that?

19 THE REGISTRAR: 322.7.

20 ---UNDERTAKING NO. 322.7: Ontario Hydro undertakes to
21 provide breakdown of the in-service
committed and proposed projects.

22 MR. SHEPHERD: Q. That's not going to
23 tell us anything about project size or heat rates or
24 locations within the province, or anything like that?

25 MR. BROWN: A. It would tell you the

1 in-service committed and proposed megawatts in each
2 category of the NUG plan.

3 Q. And that's it?

4 A. And number of projects if you want
5 that, too.

6 Q. Fine. And the final one is project
7 performance information and I assume that that's also
8 confidential?

9 A. We talked about that yesterday and I
10 did provide you with some information in aggregate form
11 and it was provided in an interrogatory, some of that
12 information. I will refer you to...

13 Q. This is the reliability information?

14 A. That's correct.

15 Q. Okay. That's the only information
16 you have provided on that?

17 A. In 5.14.141 is some of that
18 information, plus what I described yesterday.

19 Q. Do you use the reliability
20 information in your forecasting?

21 A. I have to use that information to
22 determine dependability and energy available for NUGs.

23 Q. Okay. But your megawatt numbers
24 aren't dependent at all on that information; right?

25 A. Not the installed capacity.

1 Q. No. So, aside from that, which
2 doesn't relate to your megawatt forecasts, none of the
3 project performance information on which you base your
4 forecast can be tabled before this Board?

5 A. You can you repeat that?

6 Q. Aside from the reliability
7 information, which as I understand it does not impact
8 on your megawatt forecast, aside from that, none of the
9 project performance information that you rely on for
10 your forecast is or will be tabled to this Board; is
11 that correct?

12 A. There isn't any, though.

13 Q. So when you say project performance
14 information in this supplementary witness statement,
15 that only relates to energy production? It doesn't
16 relate at all to megawatts?

17 A. Its dependability and capacity factor
18 for energy.

19 Q. Capacity factor but not capacity?

20 A. That's correct.

21 Q. It doesn't affect the megawatts?

22 A. That's correct.

23 Q. So we can just stroke that out.

24 Is it fair to say that, in summary of
25 this, if we look at all the sources of information you

1 use for your forecast, with a very few exceptions it's
2 confidential and therefore this Board is not allowed to
3 look at it and test it. Is that a fair generalization?

4 MR. B. CAMPBELL: Just a minute. Mr.
5 Chairman, I think it is inappropriate for my friend to
6 keep saying that the Board is not allowed to look at
7 it. If this matter is brought before the Board for a
8 ruling, Ontario Hydro will have to comply with whatever
9 ruling the Board makes.

10 It is fair to say that Ontario Hydro is
11 not volunteering this information because it has been
12 provided to Ontario Hydro on the basis that it will be
13 kept confidential. It has been provided by the actual
14 NUG proponents on that basis. And Hydro does not feel
15 free to breach that understanding with the members of
16 the industry.

17 But to say that the Board is not allowed
18 to see it, that is a matter that rests in the Board's
19 hands, not in Ontario Hydro's.

20 MR. SHEPHERD: Mr. Chairman, I am not
21 intending to bring up confidentiality. All I am trying
22 to do is establish on the record whether it's true that
23 a large proportion of the basis of the forecasts is
24 confidential information. I apologize if my choice of
25 words is inappropriate.

1 Q. Is it true that a large proportion of
2 the information on which you base your forecasts is
3 confidential?

4 MR. BROWN: A. In the long term that's
5 not true. The long term is based on resource
6 assessments which....

7 THE CHAIRMAN: As I take it from the
8 conversation, site-specific or plant-specific or
9 proponent-specific - I mean by the proponent, the
10 proposal of the NUG facility - is perhaps confidential,
11 but the results of that analysis in an aggregate basis
12 has been provided, or if it hasn't been provided, will
13 be provided. That's my understanding of the evidence
14 that I have been listening to.

15 In other words, the aggregate of what
16 they can do, to then go forward and make their forecast
17 has been provided.

18 What we won't know and what we don't know
19 is how good the underlying raw site-specific data is,
20 but I am not sure that's going to be terribly helpful
21 to the Panel. I just don't know.

22 MR. SHEPHERD: Mr. Chairman, I guess what
23 I am trying to get at is not how good the raw data is,
24 but how good Hydro's analysis of that raw data is to
25 give us --

1 THE CHAIRMAN: But you have the basis for
2 Hydro's analysis. You have the aggregate.

3 MR. SHEPHERD: I had understood Mr. Brown
4 to say that except for providing us with totals, he has
5 provided us with none of the data. All he provided us
6 with are their conclusions on the data.

7 Q. Is that not right?

8 MR. BROWN: A. I don't think the
9 conclusions is the answer. I am giving you the totals.
10 That's not our conclusion; I am just adding up some
11 numbers.

12 Q. Okay.

13 DR. CONNELL: While there is a pause, Mr.
14 Brown mentioned an interrogatory, I am not sure if that
15 is to be on the record or not. It was 5.14.141

16 THE CHAIRMAN: Is it on already?

17 THE REGISTRAR: No, sir. 5.14.141, that
18 will be 321.15.

19 THE CHAIRMAN: Thank you.

20 DR. CONNELL: Did I get the number
21 correct?

22 MR. BROWN: Yes, you did.

23 ---EXHIBIT NO. 321.15: Interrogatory No. 5.14.141.

24 MR. SHEPHERD: Q. Now, just before we
25 leave this initial series of questions, each of your

1 past projections, Mr. Vyrostkco, has been criticized
2 particularly by the industry; correct?

3 MR. VYROSTKO: A. I don't believe the
4 industry criticized last year's, the 2,100.

5 Q. Okay. Is it true that your new 3,100
6 megawatt number has been publicly criticized by the
7 industry?

8 A. I don't believe it has.

9 Q. Who is the president of the
10 Independent Power Producers, Mr. Vyrostkco?

11 A. Bruce Ander.

12 Q. Isn't it true that he spoke on
13 September 9th at a conference - Mr. Brown, you were
14 there - and said the minimum number should be 6,000
15 megawatts; isn't that right, Mr. Brown?

16 THE CHAIRMAN: It's notorious there is
17 debate between your client and Hydro as to how much
18 available NUGs there is, but how does this advance this
19 panel in the cross-examination mode?

20 MR. SHEPHERD: Well, I guess, Mr.
21 Chairman, what I am trying to get at is Hydro's numbers
22 haven't got to the point where they have reached the
23 industry's numbers, No. 1. And No. 2, Mr. Vyrostkco
24 seems to think that nobody is criticizing his number,
25 he has just testified to that.

1 MR. B. CAMPBELL: No, no. What Mr.
2 Vyrostkco answered was question, is the industry
3 critical of it. With respect, Mr. Shepherd, for you to
4 draw the conclusion that everybody is critical of it
5 from that, is, in my submission, simply incorrect. He
6 was asked a very general question and there are a lot
7 of people out there in the industry.

8 THE CHAIRMAN: I really wonder whether it
9 matters. There is a debate about this, we know that.

10 MR. SHEPHERD: Okay.

11 Q. It is true there is a debate about
12 the numbers currently?

13 MR. VYROSTKO: A. I think the forecast
14 that we put forward or the proposal in the chairman's
15 speech on September 11th, since that speech I have
16 heard no comments about either the new number, or even
17 the one we looked at the 1990 NUG plan, as I say, I sit
18 on a number of various committees and at no time was
19 there any criticism over that number on the committees
20 that I sit.

21 Q. So, is it your evidence then that
22 there is no significant debate over what your forecasts
23 are?

24 A. There are discussions about the
25 forecasts. There always are discussions about any

1 forecasts.

2 Q. Okay. Just one more question. Is it
3 true, is it not, Mr. Brown, that the president of the
4 industry association used a figure of 6,000 megawatts
5 as the minimum?

6 MR. BROWN: A. He had a ballpark
7 number. 6,000, 7,000, I can't recall.

8 Q. Can you comment on whether that
9 number is at all feasible?

10 A. I don't know his assumptions.

11 Q. Okay. Before we go to the sectoral
12 forecasts, perhaps we can deal with just a couple of
13 general points relative to your forecasts themselves.
14 I guess these again are directed at you, Mr. Brown.
15 You have defined technical potential. I guess the
16 easiest place to look at it is at page Roman numeral 6
17 of the 1990 NUG plan. You also defined it in the
18 transcript but I think it is easier if we just find it
19 here. This is the fourth last paragraph on page Roman
20 numeral 6 of the 1990 NUG plan.

21 DR. CONNELL: Could we use the exhibit
22 reference for the transcript?

23 MR. SHEPHERD: I'm sorry. It's Exhibit
24 83.

25 Q. In that fourth last paragraph you

1 say:

2 Technical potential, the potential for
3 development regardless of economic,
4 environmental, or other constraints.

5 That's of the definition you are working
6 with, correct, Mr. Brown.

7 MR. BROWN: A. That's what is stated
8 here, yes.

9 Q. So, just to be fairly simplistic
10 about it, if you have a particular steam host where
11 it's technically - that is in from an engineering point
12 of view - possible to produce, say, 200 megawatts of
13 thermally matched cogenerated electricity at - pick a
14 number - 10 cents a kilowatthour, that 200 megawatts is
15 in technical potential, right? Should be.

16 [10:48 a.m.]

17 A. I estimate technical potential on
18 high-efficiency cogeneration, and that is not based on
19 10 cents a kilowatthour, it's not based on any number,
20 it says not economic. It's based on thermal matching;
21 it doesn't matter what the price is.

22 Q. Okay. So whatever the price, whether
23 it's 10 cents or 20 cents or \$10 a kilowatthour, if you
24 could thermally match and get 200 megawatts at that
25 site, it's in technical potential?

1 A. That's correct.

2 Q. And environmental constraints also
3 don't reduce technical potential; right? If that same
4 site was in the City of Toronto and the City of Toronto
5 had passed an emissions by-law that made it impossible
6 to build it, it would still be in technical potential
7 but then it just wouldn't be in achievable; right?

8 A. In your example, that's true.

9 Q. Okay. And similarly, if we take
10 let's say small hydro, when I was a kid I used to
11 explore in the woods around Ancaster and there's a very
12 beautiful waterfall there which has always been my
13 favourite, and it's probably a one megawatt small hydro
14 site if you wanted to build on it.

15 Aside from the fact that nobody in their
16 right mind would destroy that waterfall, it's true that
17 that one megawatt should be in your technical
18 potential; right, assuming you know about it?

19 A. It's in our list, but we did make an
20 adjustment in that technical potential.

21 Q. Okay. Just following the definition,
22 that site should be in there?

23 A. That's correct.

24 Q. Even though environmentally you would
25 never build on it. But that's not what you actually do

1 for small hydro; right?

2 A. That's correct.

3 Q. And why not?

4 A. We remove some sites that are very
5 far north and a long way away from the transmission
6 system.

7 Q. And is that all you remove?

8 A. From the technical potential?

9 Q. Yes.

10 THE CHAIRMAN: I'm sorry, I didn't hear
11 the question.

12 MR. SHEPHERD: Q. Is that all you remove
13 from technical potential?

14 MR. BROWN: A. There are other factors
15 that are identified in exhibit --

16 Q. We don't need to go into the detail.
17 I just want sort of general comments.

18 THE CHAIRMAN: I wonder if I could ask a
19 question. Is there any upper limit on a NUG. Is there
20 anything -- can a NUG be too big a proposal, for
21 instance?

22 MR. BROWN: In the area of cogeneration,
23 it could go almost as big as they wanted to.

24 THE CHAIRMAN: Hydro is prepared to do
25 that; is that right?

1 MR. BROWN: The reason we have this extra
2 1,000 is because people are building a lot bigger than
3 an efficient cogenerator would be sized at.

4 THE CHAIRMAN: But is this consistent
5 with Hydro's general position that they are the
6 suppliers of energy in the Province of Ontario?

7 I mean, would you do a 1,000 megawatt
8 plant, for example, on a NUG basis that was doing
9 nothing else but producing electricity?

10 MR. BROWN: Up until now we have been
11 taking those where there is system availability and
12 economic.

13 THE CHAIRMAN: So size is no limit?

14 MR. BROWN: In calculating the technical
15 potential, I have calculated, what I would call, the
16 theoretical number; that's the thermal match, and if
17 there is a proposal on the table that is in the
18 proposed stage and it's higher than my technical
19 potential, I will increase the technical potential.

20 But if that project now disappears for
21 any reason, then I'll remove it and go back to my
22 theoretical number.

23 THE CHAIRMAN: What's your theoretical
24 number right now?

25 MR. BROWN: Pardon?

1 THE CHAIRMAN: What's your theoretical
2 number right now?

3 MR. BROWN: About 6,200 megawatts for
4 cogeneration.

5 THE CHAIRMAN: Thank you.

6 MR. BROWN: Sorry, I mean industrial
7 cogeneration.

8 MR. SHEPHERD: Q. 6,200 megawatts of
9 industrial. That's actually institutional, commercial
10 and residential?

11 THE CHAIRMAN: That's a single facility;
12 is that what you're talking about? I'm talking about a
13 single facility.

14 MR. BROWN: I'm talking about all the
15 facilities.

16 THE CHAIRMAN: No, I'm talking about a
17 single facility.

18 MR. BROWN: The largest one?

19 THE CHAIRMAN: Yes. What would it be?

20 MR. BROWN: Generally speaking it would
21 be around 200 to maybe 300 megawatts.

22 THE CHAIRMAN: Well, you've got one at
23 350 in your plan.

24 MR. BROWN: That's not a cogeneration
25 plant.

1 MR. B. CAMPBELL: No, I'm sorry. I think
2 the Chairman's question is not about the forecast, per
3 se.

4 As I understand the Chairman's question,
5 is: Simply how big a plant are you prepared to accept
6 on the system?

7 Do I understand that correct?

8 THE CHAIRMAN: Under the NUG, and treat
9 it as a NUG rather than Hydro doing it itself.

10 MR. CAMPBELL: Yes, as a NUG facility.
11 Perhaps -- I don't know whether it's Mr. Snelson or Mr.
12 Vyrostkco.

13 MR. VYROSTKO: Well, I think part of this
14 question we tried to address through the direct
15 evidence and through our supplementary witness
16 statement with the major supply NUGs.

17 Initially, when our business started no
18 one ever dreamed that we would be looking at projects
19 that would come in and be sized to such an extent that
20 they would have these very large projects that were
21 similar to major supply utilities and, in fact, we have
22 received proposals that were very large in our division
23 with respect to non-utility generation.

24 And once we started looking at those
25 proposals, we clearly could see that the impacts that

1 they had on the system, from an overall broader
2 perspective, were no different than any large supply
3 option that we had, and that was something that we had
4 never anticipated as we were getting into the business
5 of non-utility generation.

6 And that's why we are now looking at
7 these larger projects that look like a supply option as
8 a supply option.

9 THE CHAIRMAN: But there's no policy
10 limit on how large those could be?

11 MR. VYROSTKO: No, there is no policy on
12 what size they are.

13 MR. SHEPHERD: Q. So, your technical
14 potential for cogeneration is the theoretical
15 potential, it's an engineering concept; right?

16 MR. BROWN: A. It's based on thermal
17 matching, high efficiency.

18 Q. Yes. If you were to use the same
19 concept exactly for small hydro, then that would be
20 simply a function of the total amount of falling water
21 in the province; wouldn't it?

22 A. That is correct.

23 Q. But that's not what you do?

24 A. I limit it for practicality reasons
25 to those watersheds near the bulk electricity system.

1 Q. You, in fact, take the technical
2 potential; don't you, down from about somewhere around
3 20,000 megawatts down to closer to 1,300 megawatts; is
4 that right?

5 A. Yes, that was in my direct evidence.

6 Q. In fact, in the purest sense --

7 MR. SNELSON: A. That reduction, Mr.
8 Shepherd, was for a variety of reasons, some of which
9 is that a large part of that is already developed by
10 Ontario Hydro.

11 Q. Understood. We're going to go
12 through that in some detail later, probably Monday.
13 I'm just trying to get the concept straight.

14 So technical potential in small hydro,
15 not the same concept as technical potential in cogen;
16 is it?

17 MR. BROWN: A. No. In some areas we
18 apply a practicality restriction such as small hydro.

19 Q. Okay. So where it says:

20 "Technical potential means regardless
21 of economic, environmental or other
22 constraints...", that applies to cogen,
23 it does not apply to small hydro; right?

24 A. That's generally true.

25 Q. Okay. Similarly, again, if we're

1 thinking in an engineering sense, there should be a
2 significant potential for solar; shouldn't there?
3 Isn't that only limited by the amount of land you have
4 available to put up solar panels?

5 A. It is a large potential.

6 Q. I mean, in theory. Right. But you
7 have a zero technical potential for that because of
8 economics?

9 A. I don't identify technical potential.

10 Q. Okay. The same is true of wind. You
11 in fact have made no effort to determine the technical
12 potential of wind; have you?

13 A. There are assessments of that.

14 Q. You do have one?

15 A. There has been one produced by the
16 Canadian Wind Association.

17 Q. Okay. Do you have that?

18 A. I'm not sure. I have seen it, I
19 believe I saw it in Ottawa.

20 Q. I'll see if I can find it.

21 DR. CONNELL: There are some tides too, I
22 saw them last month.

23 MR. SHEPHERD: Sorry?

24 DR. CONNELL: There are tides too, I saw
25 them last month.

1 MR. SHEPHERD: Tides.

2 Q. We're going to come back to wind
3 energy to see whether you should have excluded it
4 later.

5 Now, this same engineering concept, it's
6 the reason why you say the technical potential for
7 conventional fossil is unlimited; isn't it, because
8 from an engineering point of view it is unlimited?

9 MR. BROWN: A. From a NUG point of view
10 they can build a major supply NUG just the same as
11 Ontario Hydro can build a conventional generation
12 station.

13 Q. So you don't have to worry about the
14 price of the environment, you can build as much of it
15 as you want?

16 A. No, that's not what I said.

17 Q. Well, didn't you say the technical
18 potential is unlimited?

19 A. Yes.

20 Q. Isn't that what that means?

21 A. Yes, okay. Technical potential,
22 that's true.

23 Q. I'm not trying to catch you out here.

24 A. No.

25 Q. I'm just trying to figure it out.

1 So, if you're just looking at it from a technical
2 potential point of view, 10,000 megawatts of
3 conventional fossil, say, major supply NUGs - and I'm
4 deliberately choosing a ridiculously high figure,
5 okay - that sort of number would require more gas
6 transmission, you would have a problem there, but
7 that's not a technical constraint, that's an economic
8 one or an environmental one; right, how much would it
9 cost to build the gas transmission, would you get the
10 environmental approvals, but you could still do it?

11 A. From an engineering point of view,
12 yes.

13 Q. The thing that I'm struck by is that
14 you have technical potentials that are real technical
15 potentials, engineering technical potentials for the
16 combustion technologies, but for the renewables
17 technologies you use a technical potential that is
18 basically a type of economic potential; isn't that
19 true?

20 A. For a small hydro, that's correct.

21 Q. Well, on wind and solar you just take
22 them out entirely?

23 A. I don't state technical potential.

24 Q. Well, no. What you say is that
25 they're all economic so we haven't bothered. Isn't

1 that what you've said in the NUG plan?

2 A. They're economic at this time, and
3 they haven't been included in the analysis. I didn't
4 say there's no technical potential.

5 Q. Sorry. You're saying they're
6 economic at this time; is that what you're saying?

7 A. You did. They're in the 1990 NUG
8 plan, the saying was: They're uneconomic at this time.

9 Q. All right. Let's go to achievable
10 potential. Now, if I understand this right and, again,
11 I'm looking at the same definition on page Roman
12 numeral 6 of the NUG plan, it says:

13 Achievable Potential. The potential
14 for development that can be realistically
15 achieved taking into account all
16 identifiable relevant factors.
17 That's the definition you're working
18 with; right?

19 A. Yes.

20 Q. Now, unlike technical potential, that
21 definition applies to all technologies equally;
22 correct?

23 A. Yes, it's our forecast.

24 Q. And you apply that definition exactly
25 the same way to all technologies; correct?

1 A. Yes, to get a realistic forecast.

2 Q. Okay. So, when we look at the
3 example I gave earlier of the 200 megawatts of
4 expensive cogeneration, that's technical but it's not
5 achievable; it's taken out of achievable because you
6 can't do it?

7 A. Yes.

8 Q. And my favorite waterfall, again,
9 that's technical but it's not achievable for the
10 environmental reasons?

11 A. If we know that, yes.

12 Q. Trust me, nobody's going to build a
13 site. I mean, I like small hydro and I would never
14 build a site there.

15 All right. I get a sense - and maybe you
16 could correct me if I'm wrong - that you have, in
17 effect, technical is an engineering concept, if we look
18 at it as what an engineer would say you could do, and
19 achievable is what the bank will say you can do, if I
20 can put it in the vernacular.

21 Have I got the right idea?

22 A. That's a good way.

23 Q. All right. Your forecasts are
24 sensitive to many factors of which the most important
25 is the price you pay to private producers; isn't that

1 correct?

2 A. That's one of them.

3 Q. Isn't it the most important?

4 A. Not at this time.

5 Q. Well, let's see. Maybe you could
6 take a look at Interrogatory 5.14.81.

7 THE CHAIRMAN: Give that a number,
8 please.

9 THE REGISTRAR: Yes. 321.16.

10 ---EXHIBIT NO. 321.16: Interrogatory No. 5.14.81.

11 MR. SHEPHERD: Q. And if you take a look
12 at page 22, can you identify what this document is
13 attached to 5.14.81?

14 MR. BROWN: A. Ontario Hydro's business
15 plan for the period 1991 to the year 2000.

16 Q. Okay. Take a look at page 22. And
17 I'm looking at the left-hand column, third last
18 paragraph.

19 [11:04 a.m.]

20 It says the level of NUG development is
21 directly linked to the purchase rates offered by Hydro;
22 is that correct?

23 A. There is a direct link there.

24 Q. Thank you. But you said this is
25 still not the key variable here; price is still not the

1 key variable. Right?

2 A. We are talking about a NUG plan or
3 the current situation?

4 Q. No, I am talking about the current
5 situation.

6 A. Right now the gas situation has made
7 that a bigger variable than the price we are paying.

8 Q. Will you take a look at 5.14.286,
9 then?

10 THE REGISTRAR: 321.17.

11 ---EXHIBIT NO. 321.17: Interrogatory 5.14.286.

12 MR. SHEPHERD: Q. This was answered on
13 May 28th, 1991, and it is asking about things that
14 affect the forecasts, and it says in the second line of
15 the answer, the key variable - that is, the variable to
16 the forecast - the key variable is avoided cost, which
17 I presume means price; am I right?

18 MR. BROWN: A. Avoided cost is used to
19 determine the price.

20 Q. So the key variable is price, then,
21 isn't it.

22 A. In determining the forecast it was.

23 Q. All right. Including your current
24 forecast?

25 A. I am still working on it.

1 Q. So you are not far enough along to
2 know whether price is a key variable in your current
3 forecast?

4 A. The number was just released last
5 month.

6 Q. Well, surely, Mr. Brown, if the
7 number was just released two weeks ago, or last month,
8 or however you want to describe it, surely you have
9 done enough work on that number to know whether price
10 is a key variable?

11 MR. B. CAMPBELL: I'm sorry, the question
12 is "a" key variable, not "the" key variable?

13 MR. SHEPHERD: The key variable.

14 THE CHAIRMAN: We have had -- started off
15 with the most important, then key. Now, which is it?
16 What are you asking him?

17 MR. SHEPHERD: Q. I will stick with "the
18 key variable".

19 MR. BROWN: A. The key variable, I
20 expect, in the next forecast will be the gas price.

21 Q. So then these earlier statements in
22 the business plan and in the interrogatory answer that
23 the key variable was price or avoided cost, that's not
24 true anymore?

25 A. These were in relation to the 1990

1 forecast.

2 Q. Okay. Is it fair to say that the
3 price you pay is an important factor?

4 A. Yes.

5 Q. All right. Do you know -- actually,
6 I am going to ask you this, Mr. Vyrostkco. We will come
7 back to Mr. Brown, if necessary.

8 Do you know what a supply curve is?

9 MR. VYROSTKO: A. I believe I do, as it
10 applies to general marketing principles.

11 Q. Okay. Well, actually, a supply curve
12 is something that engineers use too sometimes; right?

13 A. That I wouldn't be familiar with.

14 Q. Well, aren't you an engineer?

15 A. I am.

16 Q. But you wouldn't be familiar with
17 whether engineers use supply curves?

18 A. I haven't used it.

19 Q. You never use one? All right. Maybe
20 I had better ask Mr. Brown.

21 Mr. Brown, you are also an engineer;
22 right?

23 MR. BROWN: A. That's correct.

24 Q. In fact, you are an engineer too,
25 aren't you, Mr. Snelson?

1 MR. SNELSON: A. Yes.

2 Q. Just curious. Mr. Brown, are you
3 familiar with what a supply curve is?

4 MR. BROWN: A. Yes.

5 Q. All right. I am showing you a
6 hypothetical supply curve for independent power in
7 Ontario, and I tell you right off that is not what I
8 think the supply curve looks like, but I am just trying
9 to get from simple to complicated.

10 Is it correct to say --

11 THE CHAIRMAN: Can we reference this some
12 way?

13 MR. SHEPHERD: Mr. Chairman, maybe I
14 should explain my situation with overheads.

15 I have a number of overheads, perhaps a
16 dozen, but the last half of the pile is based on some
17 information that Hydro gave me yesterday morning which
18 we had agreed they would give me yesterday morning, so
19 they haven't been prepared yet.

20 I would appreciate it if I could
21 undertake to give you the whole package of overheads on
22 Monday morning when I will have all of them available.

23 THE CHAIRMAN: But this particular
24 overhead, has it been filed or anything?

25 MR. SHEPHERD: No, I was going to give

1 you the package together.

2 THE CHAIRMAN: What are we going to do
3 now in the meantime, look at the screen? Is that what
4 you are....?

5 MR. SHEPHERD: I can have copies made,
6 Mr. Chairman, but the ones I am using today are not
7 ones that I think it will be necessary for you to have
8 copies.

9 THE CHAIRMAN: Someone may be reading the
10 transcript and may want to know what this is and what
11 it looks like, and how are they going to do that? That
12 is what I am --

13 MR. B. CAMPBELL: May I suggest, Mr.
14 Chairman, as long as we are dealing with this level of
15 simplicity in the overheads, I am quite content to
16 proceed on the basis that we get an exhibit number, we
17 refer to this one as page 1 of the exhibit number, and
18 Mr. Shepherd, I am sure, can arrange to have it
19 numbered that way as we go along.

20 THE CHAIRMAN: So let's give it an
21 exhibit number now, then.

22 THE REGISTRAR: 326.

23 ---EXHIBIT NO. 326: Overhead produced by Mr. Shepherd.

24 MR. SHEPHERD: Mr. Chairman, for the
25 overheads I use today I will provide copies in loose

1 form probably at lunch, if that's all right.

2 THE CHAIRMAN: So this is 326, No. 1,
3 that we are looking at right now?

4 MR. SHEPHERD: Page 1, yes.

5 Q. Mr. Brown, is it correct to say that
6 a supply curve - whether this one is right or not is
7 another matter - a supply curve tracks the amount of
8 supply of a given commodity such as electricity that
9 would be available at a given price?

10 MR. BROWN: A. It's one -- it could be
11 done in any parameter.

12 Q. The most common is price?

13 A. Of what? It could be price of
14 electricity, price of gas.

15 Q. Undoubtedly.

16 A. Yes.

17 Q. But since we are talking about the
18 price you pay to producers let's assume that when we
19 talk about a supply curve we are talking about
20 megawatts at a given price you pay to producers; is
21 that fair?

22 A. That's one supply curve.

23 Q. All right. I am going to ask Mr.
24 Mondrow to put up another supply curve. The first one
25 isn't actually what supply curves look like, is it.

1 Supply curves rarely go up in a straight line; correct?

2 A. You had no units. I couldn't tell if
3 it was straight or not.

4 Q. Well, no. I am asking you from your
5 experience. You have seen supply curves before; right?

6 A. They're normally curved, yes.

7 Q. Yes. In fact, the simplest form of
8 supply curve you would normally get is something like
9 this, isn't it, looks this sort of shape?

10 THE CHAIRMAN: This is No. 2 of Exhibit
11 326?

12 MR. SHEPHERD: This is No. 2.

13 DR. CONNELL: I think, Mr. Shepherd, you
14 should at least specify whether the supply is the
15 ordinate or the abscissa; that is, which is the --

16 MR. SHEPHERD: You will first have to
17 explain what the terms mean.

18 DR. CONNELL: The X axis or the Y axis, I
19 take it?

20 MR. SHEPHERD: The supply is the --

21 DR. CONNELL: Horizontal?

22 MR. SHEPHERD: -- confuse the horizontal
23 X axis, I guess.

24 DR. CONNELL: Right. And price is the Y
25 axis?

1 MR. SHEPHERD: And price is the Y axis,
2 yes.

3 Q. And this is a typical shape for a
4 supply curve for a commodity; is that correct?

5 MR. BROWN: A. I would define it the
6 other way around. Price is on the bottom. The X
7 variable on the horizontal; the Y variable is a result
8 of the input which is the vertical axis.

9 Q. Which means you would have a curve
10 like that, right? A curve going the other way
11 typically?

12 A. No, your curve is correct. Megawatts
13 on the left side; some commodity on the bottom.

14 Q. Beside the price. Of course. Of
15 course. All right.

16 THE CHAIRMAN: Is that the way you have
17 it?

18 MR. SHEPHERD: No, it isn't.

19 THE CHAIRMAN: You have got it the other
20 way around.

21 MR. SHEPHERD: Before the end of the day
22 that's the way I will have it.

23 Q. So a simple supply curve, is it fair
24 to say, that as you reach a minimum threshold you start
25 to get supply of a commodity, let's say price, right?

1 You have to reach a minimum threshold before you get
2 much of anything? It tends to go up rapidly and then
3 price becomes less and less of a factor in the supply
4 of the commodity; is that fair?

5 MR. BROWN: A. In the far extremes,
6 that's true.

7 Q. Okay. I would like you to look at
8 the next one which is actually the point. Is it not
9 fair to say that in things like electrical generation
10 your supply curve is controlled by several thresholds;
11 that is, several points at which the supply will go up
12 rapidly as you reach a certain price level? Is that
13 true?

14 A. I don't know if I can answer that.

15 Q. Because...why?

16 A. Well, I have provided a supply curve
17 in the 1990 NUG plan, Exhibit 83, and it doesn't show
18 those properties.

19 Q. Can you show us that supply curve?

20 A. Graph A3.13 on page 49, Exhibit 83.

21 Q. A3.13. All right. Of course, this
22 is based on your incorrect spreadsheets, isn't it? I
23 mean, I thought we were just throwing these graphs out
24 because the spreadsheets were wrong.

25 A. My mistake on the exhibit number.

1 Exhibit 143.

2 Q. I don't have it, but --

3 A. If we are talking generalities, then
4 the one in the NUG plan is sufficient.

5 Q. So you don't think that a supply
6 curve will generally have multiple thresholds and that
7 sort of thing?

8 A. I haven't done the analysis to
9 support that.

10 Q. You don't know?

11 MR. B. CAMPBELL: That is not what he
12 said.

13 MS. PATTERSON: Sorry, which page?

14 MR. SHEPHERD: Sorry?

15 MS. PATTERSON: Which page are we looking
16 at? 143?

17 MR. BROWN: Exhibit 143, graph A3.13, the
18 very last page. It's titled, "Cogeneration Potential,
19 Megawatts Versus Purchase Rate".

20 MR. SHEPHERD: Q. So my question was:
21 Do you think it's generally true in the case of
22 generation, electrical generation, that there are
23 multiple threshold levels and therefore that the curve
24 is irregular, something like this?

25 MR. BROWN: A. I don't have any support

1 for that.

2 Q. Okay. Let me come at this a
3 different way. Let's just take small hydro. We don't
4 need the supply curve anymore. In retrospect it may
5 not have been the greatest idea anyway.

6 Let's just take small hydro for a second.
7 Is it fair to say that below a certain price you are
8 going to get very little small hydro because the
9 technology simply can't be done at that price; is that
10 fair?

11 A. Small hydro is very site specific.

12 Q. Okay.

13 A. There is no one number.

14 Q. Do you think there is a minimum
15 threshold?

16 A. For a particular site that's true.

17 Q. No, in general.

18 A. I don't know of one.

19 DR. CONNELL: Threshold? You mean power
20 threshold?

21 MR. SHEPHERD: Q. For example, if the
22 price was a tenth of a cent a kilowatthour do you think
23 you could at any site in the province of Ontario
24 produce small hydro?

25 MR. BROWN: A. No.

1 Q. One cent?

2 A. I don't have the information to go
3 further in this scenario. On a particular site basis
4 there will be a particular price where that site starts
5 to become economic.

6 Q. And there is no way of generalizing
7 what sites normally will cost?

8 A. They're all different.

9 Q. Is it fair to say that you have a
10 grouping of a large number of sites in the province of
11 Ontario for which the capital cost would be sort of
12 \$2,000 per installed kilowatt plus or minus 10 per
13 cent? Is that a reasonable statement?

14 A. That's an industry number, yes.

15 Q. No, I am asking whether you agree
16 that that is a reasonable number -- reasonable
17 statement to make.

18 A. That is a general number for small
19 hydro.

20 Q. Okay. Is it also fair to say that
21 there is another group of sites which because of
22 environmental or transmission considerations would be
23 developed if the capital costs that you could afford to
24 spend were \$3,500 a kilowatt plus or minus 10 per cent?

25 A. I am sure there is.

1 Q. And what I am asking is: Are those
2 sort of lumps of sites with fewer sites in the middle
3 between those two ranges?

4 A. I don't agree with -- every site is
5 different, and there is no one group with a space in
6 the middle.

7 You could probably rank all the sites in
8 the province and have a number for it, and I don't
9 expect there would be a grouping here and a grouping
10 there.

11 Q. You think it would be sort of a
12 straight line or a normal curve?

13 A. Well, even the 2,000 is just an
14 average. There is plus or minus on both sides of that.

15 Q. Okay. Is it fair to say that --
16 let's just talk about price increases for independent
17 power for a second. It is a subject close to my heart.

18 Is it fair to say that certain price
19 increases, let's say from 4.2 cents to 4.7 cents - and
20 don't get married to the numbers; it's just an
21 example - certain price increases may not have a
22 significant effect on how much more small hydro you can
23 achieve, whereas other price increases, for example 4.7
24 to 5.2, might have a very significant effect?

25 Is that something that happens in the

1 marketplace?

2 A. You have to look at all the other
3 factors why projects are not proceeding at those
4 prices.

5 [10:25 a.m.]

6 Q. Is that a yes or a no?

7 A. I can't answer your question.

8 Q. Maybe we will come back to this
9 stuff.

10 Aside from the one supply curve that you
11 have, which I guess is now in 143, which is overall
12 cogeneration potential; correct?

13 A. No, that's not correct. This is
14 industrial cogeneration.

15 Q. This is only industrial cogeneration,
16 okay. Aside from that, can you now table your supply
17 curves for each of the other technologies?

18 A. We don't have one for any other
19 technology.

20 Q. Is it fair to say that if there were
21 changes in prices to the other technologies, that your
22 numbers would be different, your forecast?

23 A. There would be changes, yes.

24 Q. Is it fair to say that they could be
25 significant?

1 A. I think that's technology specific.

2 Q. Okay. I take it you will agree that
3 this Board could conceivably conclude that the price
4 that should be paid for, let's say, renewables, should
5 be higher or lower for that matter, depending on the
6 reading of the evidence presented to them? I take it
7 you will agree that they could come to that conclusion?

8 A. I can't comment on that.

9 Q. Let's assume that this Board did, in
10 order to determine what sort of independent power would
11 be available, don't they need supply curves so that
12 they can plot, well, we have increased the price 10 per
13 cent, what does this mean?

14 A. That would be good information to
15 have.

16 Q. In fact, I am a little surprised, I
17 would have thought you would need supply curves for
18 your own planning, wouldn't you?

19 A. I have a forecast.

20 THE CHAIRMAN: I beg your pardon?

21 MR. BROWN: We forecast the long-term
22 potential based on present rate conditions.

23 MR. SHEPHERD: Q. But you have seen
24 major changes in rates over the last few years,
25 shouldn't you be able to know that a change in rate

1 will have a particular result?

2 MR. BROWN: A. The information that we
3 have on these technologies at this time cannot support
4 producing such curves. A lot of the information we
5 have is based on project development information, so as
6 the rates change we will get more projects.

7 Q. If a supply curve would show, let's
8 just hypothesize, that a supply curve would show that
9 if you increased the price for NUGs just 8 per cent,
10 you would get another 3,000 megawatts. Just accept the
11 hypothesis for the moment. That would certainly be
12 something that this Board should know; right?

13 A. That's correct.

14 Q. And that's certainly something that
15 you should know; right?

16 A. That's right.

17 Q. But you don't know whether that is
18 correct; do you?

19 A. Our analysis today is focused on the
20 major part of the plan which is cogeneration.

21 Q. Okay. And if a supply curve would
22 show, just quite a different example, that let's say a
23 12 per cent price increase for renewables would allow
24 you to get, let's say, 3,000 megawatts more renewable
25 energy than you currently have projected, that's also

1 something that both you and this Board should know;
2 right?

3 A. There will be information in Panel 8
4 that identifies the economics of some of those
5 renewables.

6 Q. Will they be tabling supply curves
7 for renewables?

8 A. I am not sure what that panel is
9 going to be doing.

10 Q. You don't have a supply curve for
11 small hydro?

12 A. No, I don't.

13 Q. Small hydro is a renewable?

14 A. That's correct.

15 Q. Would it be a lot of work for you to
16 produce supply curves for the various technologies in
17 your NUG plan?

18 A. I don't think they can be done for
19 renewables.

20 Q. Because?

21 A. To do that would require
22 site-specific information, specifically on small hydro
23 of every site to determine economics.

24 Q. Okay. Could you do a supply curve
25 for wood waste?

1 A. At this time I can't.

2 THE CHAIRMAN: I'm sorry?

3 MR. BROWN: I can't at this time, no.

4 MR. SHEPHERD: Q. I guess things like
5 municipal solid waste and landfill gas are so limited
6 by the number of sites that it is not necessary to do a
7 supply curve; is that correct?

8 MR. BROWN: A. There are other factors
9 other than price to determine our attainable potential.

10 Q. Price is not as important in those
11 areas?

12 A. They are more concerned with waste
13 disposal than they are in the production of
14 electricity.

15 Q. Although I do recall you have said
16 somewhere, I don't remember where, that in the case of
17 municipal solid waste you have limited the sites that
18 you have looked at for planning purposes to the very
19 big ones because the small ones are uneconomic; true?

20 A. Our assessment is based on total
21 waste in the province.

22 Q. Maybe I am thinking of something
23 else. I thought there was somewhere here where you
24 said that it was only towns of 50,000 people or more.

25 A. That's correct.

1 Q. So then you could do a supply curve
2 for municipal solid waste which would show as the price
3 went up, smaller towns could do it; right?

4 A. MSW is not really driven by price.
5 It's the tipping fee which is dependent on the size.

6 Q. And in fact, isn't it true that you
7 don't have any information on tipping fees and make no
8 assumptions on that in your analysis of MSW?

9 A. It has been provided in a reference
10 and it will be discussed later in Panel 8, but there is
11 information that has been provided.

12 Q. Well, haven't you in fact said in
13 answer to an interrogatory, Ontario Hydro has no
14 assumptions with respect to tipping fees?

15 A. When I determined a NUG plan, it
16 wasn't based on tipping fee information.

17 Q. All right. But that is the bulk of
18 the economics of an MSW facility?

19 A. Yes.

20 MR. SHEPHERD: Mr. Chairman, that might
21 be an appropriate time for a break.

22 DR. CONNELL: I wonder if I could ask one
23 or two questions about graph A3-13 in Exhibit 143. Do
24 I understand that all the data that are plotted here
25 meet the avoided cost test?

1 MR. BROWN: No, no. This is the increase
2 in capacity by increasing the purchase rate.

3 DR. CONNELL: Yes.

4 MR. BROWN: The avoided costs are the
5 numbers that are provided in the spreadsheet. They are
6 around 4.2 or 4.4, if you increase the purchase rate
7 above those numbers. This is the supply curve for
8 industrial cogeneration.

9 DR. CONNELL: Right. Would it be
10 possible to replot this curve normalizing on avoided
11 cost? That is so the ordinate had avoided cost
12 project-by-project? Say, if you showed the avoided
13 cost as 100 per cent and then simply summed the
14 project, obviously as you move to the right it would
15 cross over that line.

16 MR. BROWN: If you turn back to the
17 previous graph, that would give a better reflection of
18 that, and that's the site by site information based on
19 rate of return. As the avoided cost increases we get
20 more and more sites going from right to left.

21 DR. CONNELL: I will study this. Thank
22 you. I don't want to hold up the break.

23 THE CHAIRMAN: All right. We will break
24 for 15 minutes.

25 THE REGISTRAR: This hearing will recess

1 for 15 minutes.

2 ---Recess at 11:30 a.m.

3 ---On resuming at 11:47 a.m.

4 THE REGISTRAR: Please come to order.
5 This hearing is again in session. Be seated, please

6 THE CHAIRMAN: Mr. Shepherd?

7 MR. SHEPHERD: Q. Just before we leave
8 this topic we have been talking about, Mr. Brown, the
9 term buy-back rates, am I correct that it refers to the
10 price Ontario Hydro pays to independent producers for
11 power?

12 MR. BROWN: A. Yes, that's true.

13 Q. I wonder if you could turn to
14 Interrogatory 5.14.43, the revised answer.

15 THE REGISTRAR: 5.2.43?

16 MR. SHEPHERD: No, 5.14.43.

17 THE REGISTRAR: That will be 321.18.

18 MR. SHEPHERD: Thank you.

19 ---EXHIBIT NO. 321.18: Interrogatory No. 5.14.43.

20 MR. SHEPHERD: Q. The question, Mr.
21 Brown, says:

22 Please provide a copy of all internal
23 Hydro memoranda, working papers, reports,
24 studies or other documents that examine
25 or discuss the relationship between

1 buy-back rates and the economic potential
2 for cogeneration or other types of NUGs.
3 You have referred to the 1990 NUG plan.

4 And then at the end of the first paragraph of your
5 answer you say:

6 As such the relationship between
7 buy-back rates and economic potential is
8 not available.

9 And you go on to say:

10 There are no internal reports or
11 studies other than the NUG plan on this
12 subject.

13 Am I right to take from that that you
14 have not done any disciplined studies on the
15 relationship between price and NUG potential?

16 MR. BROWN: A. This interrogatory is
17 reference to the industrial cogeneration where we did
18 do that.

19 Q. Yes.

20 A. In the other areas that are included
21 in the plan, this interrogatory is correct, we have not
22 done that in a disciplined fashion.

23 Q. Have you done it in some other
24 fashion?

25 A. We have general thresholds of the

1 some of the technologies, starting thresholds.

2 Q. Do we have those in evidence
3 somewhere?

4 A. Not yet.

5 Q. Can you provide them?

6 A. They are being provided through Panel
7 8, as Mr. Campbell has already mentioned.

8 THE REGISTRAR: Is that an undertaking?

9 THE CHAIRMAN: No, not yet.

10 MR. SHEPHERD: No, I am not sure I
11 understand.

12 MR. B. CAMPBELL: As I have tried to
13 explain on several occasions, Mr. Chairman, that with
14 respect to some of the alternative electricity
15 generation technologies, we have a package of
16 information that has been put into report format and is
17 now in printing, and that is going to be provided as
18 soon as it's back from printing and will be witnessed
19 on Panel 8 as I have said, and it covers such matters
20 as both the description of the technology, its pricing
21 and environmental considerations.

22 MR. SHEPHERD: Q. And that document,
23 that has wind and solar and peat and biomass and things
24 like that in it?

25 MR. B. CAMPBELL: That's correct.

1 MR. BROWN: Yes.

2 MR. SHEPHERD: Q. It doesn't have any of
3 the ones that you deal with in the NUG plan?

4 MR. BROWN: A. MSW is treated in both
5 and wood waste is in both.

6 THE CHAIRMAN: What is the last one? I'm
7 sorry, I didn't hear you.

8 MR. BROWN: Wood waste and municipal
9 solid waste are in both.

10 MR. SHEPHERD: Q. And small hydro isn't
11 in this new one coming up?

12 MR. BROWN: A. That's correct.

13 Q. We will see in this new report then
14 an analysis of the relationship between price and
15 potential; is that true?

16 A. The report as I mentioned in my
17 direct is addressing the economics of these
18 technologies.

19 Q. So maybe we better wait and see what
20 it says.

21 So, aside from that, you said you haven't
22 done any disciplined analysis and the only analysis you
23 have done is that, on the relationship between price
24 and potential?

25 A. Yes, and we have a general idea of

1 where some of these technologies are.

2 Q. Okay. Is it fair to say that the
3 price you pay for power influences not only how much
4 independent power you get, but the types of independent
5 power that are available to you as well, the
6 technologies, the fuel sources?

7 A. There are a lot of key factors that
8 will vary from time to time, and one particular period
9 over the planning period price may be the important
10 factor, at other periods it may be gas, it may be
11 economics, it may be environmental.

12 Price is a factor.

13 Q. That wasn't my question. We already
14 dealt with that question.

15 My question is: Is it fair to say that
16 the price you pay for power influences not only how
17 much independent power you get, but the types or
18 technologies or fuel sources in the independent power
19 projects that are proposed to you?

20 [12:00 p.m.]

21 A. Yes, because at different prices you
22 get different technologies. Some are more economic at
23 say 5 cents than others are and, as you increase the
24 price, there may be other technologies that come into
25 play.

1 Q. Subject to the fact that there are
2 probably hundreds and hundreds of exceptions, and I
3 accept that that's the case, is it a fair
4 generalization to say that higher prices mean increases
5 in more environmentally attractive NUG supply options?

6 THE CHAIRMAN: I'm not sure what you mean
7 by more environmentally attractive NUG supply options.

8 MR. SHEPHERD: NUG supply options with
9 fewer negative environmental impacts.

10 THE CHAIRMAN: Well, could you be
11 specific. What are you talking about?

12 MR. SHEPHERD: I'm going to go through
13 some examples, Mr. Chairman.

14 THE CHAIRMAN: Well, I think that would
15 be more helpful to the witnesses, if you do that, if
16 you were more specific.

17 MR. SHEPHERD: Okay, I'll come back to
18 the generalization at the end.

19 Q. If you paid 50 cents a kilowatthour
20 let's just say, or \$1 a kilowatthour, would you agree
21 that 1,000s of megawatts of solar energy might well be
22 offered to you?

23 MR. BROWN: A. They'd definitely be
24 economic.

25 Q. Well --

1 A. I guess there are other factors such
2 as the engineering aspects of where you're going to put
3 these, that hasn't been looked at.

4 Q. So you don't know whether, if you
5 paid that much, you would get solar energy at all; is
6 that --

7 A. There would be some, like...

8 Q. A lot, a little?

9 THE CHAIRMAN: I think this is almost a
10 Panel 3 discussion that we had before. I'm having sort
11 of a deja vu about this, but I may be wrong.

12 MR. SHEPHERD: No, I don't understand why
13 it would be Panel 3.

14 THE CHAIRMAN: In Panel 3, I think you
15 asked, if you raised the prices you paid you would get
16 more, and that seems to be a fairly fundamental
17 proposition.

18 MR. SHEPHERD: Mr. Chairman, what I'm
19 going after is the supply mix and the environmental
20 impact of --

21 THE CHAIRMAN: Well, I think you should
22 be more specific than you are.

23 MR. SHEPHERD: Q. Is it on the whole
24 generally true, Mr. Brown, that solar energy has fewer
25 negative environmental impacts than, say, conventional

1 fossil generation?

2 MR. BROWN: A. In terms of solar, I
3 believe it has a very positive impact on environment
4 compared to the production of electricity.

5 I can't comment on the lifecycle -- the
6 lifecycle environmental impacts of that technology.

7 Q. It could actually not be
8 environmentally as good as --

9 A. I'm not familiar with the production
10 of these types of equipment or their disposal.

11 Q. Okay. Mr. Brown, are you familiar
12 with the non-fossil fuel obligation in the United
13 Kingdom; do you know what it is?

14 A. No, I don't.

15 Q. Mr. Vyrostk, are you familiar with
16 that?

17 MR. VYROSTKO: A. No, I'm not.

18 Q. Mr. Snelson, are you familiar with
19 that?

20 MR. SNELSON: A. Only from what I've
21 read in the press. I don't have any expert knowledge
22 of it.

23 MR. SHEPHERD: I would like to file an
24 exhibit then. Copies have been provided.

25 THE REGISTRAR: That will be No. 327.

1 MR. SHEPHERD: This is copies of two
2 articles from Independent Power Report.

3 ---EXHIBIT NO. 327: Copies of two articles from
4 Independent Power Report.

5 MR. SHEPHERD: Q. Mr. Vyrostkco, you read
6 this journal; don't you?

7 MR. VYROSTKO: A. Yes, I do.

8 Q. You're a subscriber of that; right?

9 A. Either myself or some of the staff
10 are, yes.

11 Q. Okay. So, I guess I can take it
12 you've seen these articles before?

13 MR. B. CAMPBELL: Well --

14 MR. VYROSTKO: To suggest that having
15 been a subscriber to a magazine and that I would
16 necessarily either see or even, in fact, remember this
17 article, I can't say that.

18 MR. SHEPHERD: Q. Okay, fair enough.
19 Can you describe what Independent Power Report is, what
20 that journal is?

21 MR. VYROSTKO: A. The general context of
22 the article -- or of the magazine is that it tries to
23 talk about the developments that are occurring in
24 different areas of the globe really with respect to
25 independent power and some of the developments in

1 different areas.

2 Q. It's not like MacLeans or something
3 like that, right, it's a much more technical journal
4 than that; is that fair to say?

5 A. I would say it's a more technical
6 journal, that's right.

7 Q. Is it fair to say that it's a source
8 of information on independent power around the world
9 that many people, including your division, rely on
10 heavily?

11 A. I can't say that.

12 Q. No?

13 A. It is a source of information for a
14 lot of people, I can't answer if people rely on it
15 heavily because it's strictly a publication.

16 Q. All right. I'm just reading these
17 two articles and it might be worthwhile just -- maybe I
18 could wait a minute and let everybody read them,
19 they're not that long.

20 Mr. Snelson, just maybe as a preliminary
21 question. From what you know of the non-fossil fuel
22 obligation, is it fair to say that is a statutory
23 requirement in the United Kingdom that utilities must
24 purchase a certain amount of non-fossil generation;
25 that is, not including nuclear as well by the way, at

1 prices well above avoided cost?

2 Is that a fair description from what you
3 know of it?

4 MR. SNELSON: A. I know it's an
5 obligation to buy certain types of technology by those
6 generators. My knowledge of it is from articles such
7 as this one, and on the second page of your exhibit it
8 says:

9 "National Wind said...", sorry.

10 "Currently the NNFO requires U.K.
11 electric utilities to buy a certain
12 amount of power from renewable sources,
13 even if the cost is above market rates
14 for power generated with fossil fuels."
15 And that's my general understanding and I
16 know nothing much more than that.

17 Q. Okay. This is not something that
18 from a pricing point of view for NUGS you've
19 investigated, whether you should have some sort of
20 special additional payment of this sort of magnitude
21 for renewables; is that right?

22 MR. VYROSTKO: A. I think the one
23 element that we have instituted to try to reflect some
24 of the value of renewables is the 10 per cent
25 preference adder that we have for projects with

1 renewable fuels.

2 Q. Yes, okay. I guess what I'm after
3 is, for example, when you designed the preference
4 premium, did you investigate what other people were
5 doing to deal with preferring renewables?

6 A. No, we didn't.

7 Q. Okay. I'm just sort of using this
8 article as a jumping off point here. It says in the
9 first article, the one that says National Power
10 Southwestern Take Equity Roles, et cetera.

11 About halfway down it says:

12 "SWEB...", which is actually SWEP I
13 think, Southwestern Electricity PLC,

14 "...has agreed to buy the power for
15 about 14.5 cents per kilowatthour in 1992
16 plus inflation until 1998 when the
17 non-fossil fuel obligation is scheduled
18 to expire."

19 And it says after that it's about 4.8
20 cents. Fourteen-and-a-half cents -- this is a U.S.
21 publication; right?

22 A. Yes.

23 Q. So 14-1/2 cents U.S. would be about
24 16.7 cents Canadian, in that range?

25 A. (Shrugging)

1 Q. If you paid 16.7 cents per
2 kilowatthour, is it fair to estimate that you would get
3 a large amount of wind energy in the Province of
4 Ontario offered to you?

5 MR. BROWN: A. At those prices there is
6 potential for wind in Ontario, the number I'm not sure,
7 and I don't know when you make reference to large what
8 you're referring to?

9 Q. Can you give us an order of
10 magnitude; are we talking 10, 100, 1,000 megawatts,
11 10,000 megawatts, I mean?

12 A. All I can remember is the Can WEA
13 report being mentioned earlier. They were talking in
14 the order of 7 cents and they expected to get 30
15 megawatts of wind in Ontario.

16 Ontario is nonplus with the seas around
17 it to get a lot of wind.

18 Q. So we should think in terms of orders
19 of magnitude of small amounts even at high prices; is
20 that fair?

21 A. Compared to the rest of the
22 generation in the province, yes.

23 Q. And, again, is it fair to state as a
24 generalization that wind energy has fewer negative
25 environmental impacts than conventional fossil, or

1 combined cycle, or something like that?

2 A. I think it will be discussed in Panel
3 8. As I mentioned, the economics and environmental
4 considerations are dealt with in the exhibit that will
5 be filed later and in that panel.

6 Q. So you don't know whether that
7 generalization is correct?

8 A. Well, I know they're not combustion.

9 Q. If you paid 8 cents a kilowatthour,
10 is it fair to say that your small hydro number would go
11 up dramatically from the 170 megawatts you currently
12 have in achievable potential?

13 A. I can't comment how much it will go
14 up. It will definitely show increase.

15 Q. You have no idea whether it will be a
16 large increase or a small increase?

17 A. We're still wrestling with the
18 environmental impacts on small hydro at this time.

19 Q. Can you comment -- do you know
20 whether, in general, run-of-the-river small hydro has
21 fewer negative environmental impacts than fossil fuel
22 generation?

23 DR. CONNELL: That's excluding Ancaster?

24 MR. SHEPHERD: There's always ones you
25 wouldn't want to develop, but...

1 MR. BROWN: I can't place my hand on it.
2 There is an interrogatory that addressed that question,
3 the number escapes me right now,

4 MR. SHEPHERD: Q. The number?

5 MR. BROWN: A. The number of the
6 interrogatory.

7 Q. Oh yes, okay.

8 A. That was a question.

9 Q. Okay. Do you know what the answer
10 is?

11 A. No, I don't.

12 Q. So you don't know whether small hydro
13 is better than conventional fossil environmentally?

14 A. These things are very site specific.

15 Q. Now, back to the generalization.

16 After the don't knows, I don't know whether you would
17 be able to answer this, but let's ask.

18 [12:15 p.m.]

19 If you ramped up the price on a
20 technology-specific basis, this much for this
21 technology, et cetera, or just ramped up the price
22 generally to an amount high enough to encompass these
23 renewable technologies, is it fair to say that your
24 supply mix would change to more renewables and less
25 non-renewables?

1 A. If the price was limited to those
2 technologies, that's correct.

3 Q. Well, if the price was not limited.
4 Let's say you offered everybody 10 cents a
5 kilowatthour. You would have a lot of power offered to
6 you, wouldn't you?

7 A. Then the system integration would be
8 a major, major factor that would be incorporated.

9 Q. Well, in practical terms, then -- Mr.
10 Snelson, maybe this is for you. In practical terms if
11 you were paying 10 cents a kilowatthour you couldn't
12 take all the power that would be offered to you, could
13 you.

14 MR. SNELSON: A. It is probable that
15 there would be more power offered than we need, yes.

16 Q. You would have to have some sort of
17 decision rule as to which ones you take, wouldn't you.

18 A. That is correct.

19 Q. And one decision rule is the one you
20 use now, which is economic; correct?

21 A. Economic is a significant part of our
22 decision-making in this respect.

23 Q. Okay. But, Mr. Vyrostk, from your
24 perspective in NUG Division, if you were offered, let's
25 say 15,000 megawatts and Mr. Snelson said, sorry, you

1 can only take 4,000 megawatts, one way you could decide
2 which ones to take would be the ones with the best
3 environmental impacts; is that correct?

4 MR. VYROSTKO: A. That may be one way.
5 Another way would to be to go after the ones that
6 provide the lowest price.

7 Q. Exactly.

8 MR. SNELSON: A. There is an element in
9 our direct evidence that we have given here of the sort
10 of factor you are talking about in that in the 1990s we
11 predict that we can get enough generation from
12 preferred non-utility generation technologies -
13 cogeneration, small hydro, waste fuels - that we
14 believe have desirable social and environmental
15 characteristics that we don't need to take on more
16 major supply from Ontario Hydro generation or from
17 non-utility generation in the 1990s.

18 Q. Although your plan would then still
19 have major supply in it? It still has major supply in
20 it now. It just is after the year 2000?

21 A. That is correct.

22 Q. And aside from the preference premium
23 you don't actually offer to pay more for environmental
24 benefits, do you?

25 A. Aside from the preference premium and

1 the elements of avoidance of acid gas control costs
2 that are already built into the avoided cost, those are
3 the economic factors that account for environmental and
4 social considerations in our methodology.

5 Q. Mr. Vyrostkco, are you familiar with
6 the methods used in other jurisdictions for pricing for
7 non-utility generation?

8 MR. VYROSTKO: A. I am familiar with
9 what some of the other jurisdictions use for pricing,
10 yes.

11 Q. Is it true, Mr. Vyrostkco, that
12 non-utility generation prices in many jurisdictions
13 include significant adjustments for environmental
14 impact?

15 A. I think the adjustments for
16 environmental impact apply to any supply option,
17 whether it's non-utility generation or the utility
18 option.

19 Q. Well, exactly. So, if the utility
20 wants to build a solar project they will also treat
21 that as having environmental impacts which have a
22 value?

23 A. For those that have decided to
24 include a value for that, yes.

25 Q. And that's quite common in other

1 jurisdictions, isn't it?

2 A. I don't believe it is very common.

3 Q. Okay. I am going to go on then to
4 your analysis of the potential for cogeneration.

5 I was actually going to use an overhead
6 that summarized all your numbers as we best understood
7 them, but I think in light of the fact that that
8 overhead has not been copied and it's got fairly
9 complicated numbers on it I am going to see how far we
10 get by one o'clock and then we will copy it and after
11 lunch we will put it up. We will still be on
12 cogeneration I think then.

13 Of course, one of the things we all had
14 problems with on Tuesday was trying to figure out
15 what's cogeneration and what isn't.

16 Is it fair to say that at present the
17 definition you are using for cogeneration is: Any
18 project in which the generation technology is thermal,
19 such as natural gas, and any amount of the potential
20 energy produced is used for something other than
21 electricity? Is that a correct definition as you are
22 currently using it?

23 MR. BROWN: A. In our plan we do assume
24 it's natural gas, although we recognize it could be
25 waste fuel.

1 Q. But that's not what I am after. I
2 said, the generation technology is thermal, all right -
3 whether it is waste fuel or natural gas, I don't care -
4 the generation technology is thermal, and any amount of
5 the potential energy produced is used for something
6 other than electricity. The emphasis there is on "any
7 amount". That's the current definition you are working
8 to, isn't it?

9 A. Yes, high-efficiency cogeneration.

10 Q. No, no, no. That's not what I said.

11 "Any amount." So you could have -- for
12 example, you could have a specific project in which 99
13 per cent of the energy produced went to electricity and
14 1 per cent went to heat, say. And in the definition
15 you are currently using, isn't it correct that that's
16 cogeneration?

17 A. In the calculation of the technical
18 potential and where such projects are proposed, that is
19 true.

20 Q. Okay.

21 THE CHAIRMAN: Sorry, I don't follow. Is
22 it right that if there is even a 1 per cent use other
23 than electricity generation it would come under the NUG
24 definition?

25 MR. BROWN: If the project has been

1 accepted by Ontario Hydro we include it in our
2 cogeneration numbers even if it is only 1 per cent
3 thermal load.

4 THE CHAIRMAN: But you will accept
5 something that is as low as 1 per cent in that?

6 MR. BROWN: Yes.

7 MR. SHEPHERD: Q. Just for convenience,
8 are you familiar with the term PURPA machine?

9 MR. BROWN: A. I have heard the term in
10 literature.

11 Q. That's a term, isn't it, that
12 describes a cogeneration project that isn't real
13 cogeneration; it's just a nominal amount of
14 cogeneration to qualify for certain legal rules? Isn't
15 that right?

16 A. It's a qualification process.

17 Q. But PURPA machine means that sort of
18 99 per cent/1 per cent type of cogeneration plan;
19 right?

20 A. I don't know that.

21 Q. I just want to use the terminology
22 because it's easier to refer to that type of plan as a
23 PURPA machine. Can we do that?

24 A. Well, that's what they use in the
25 United States. We are more familiar with what we use

1 in Ontario.

2 THE CHAIRMAN: That is named after a
3 piece of United States legislation; is that right?

4 MR. SHEPHERD: It is named after the
5 Public Utilities Regulatory Policies Act, which
6 required you to have thermal load to be a qualifying
7 facility and unfortunately didn't require you to have
8 thermal matching. So people would heat their coffee
9 with a little bit of heat and then provide electricity.
10 Since changed, by the way.

11 Q. Let's not call them PURPA machines,
12 if we can. I mean, we will call them something else
13 when we get to it.

14 Is it fair to say that this sort of 99
15 per cent/1 per cent type of facility, that they are not
16 cogeneration in the truest sense of the word? You
17 don't consider them -- as an engineer, you don't really
18 consider them cogeneration, do you?

19 MR. BROWN: A. No, they're very similar
20 to a major supply NUG.

21 Q. Okay. Is there any way of
22 distinguishing between what you should call
23 cogeneration and what is sort of fake cogeneration,
24 doesn't really count?

25 A. Up until now we have used a sliding

1 scale preference premium to decide that. In our direct
2 evidence we mentioned that we were working on a new way
3 to define cogeneration.

4 Q. Okay. The sliding scale that you
5 have used to date is based on heat rate; right?

6 A. That is correct.

7 Q. And it says, if I can paraphrase it,
8 if your heat rate is better than 6,000 Btus per
9 kilowatthour, then you are real cogen and you get a
10 full 10 per cent adder. If it is worse than 10,000
11 Btus per kilowatthour, then you are definitely not
12 cogen and you get no adder, and in between you are
13 somewhere in the middle and you get some of the adder;
14 is that right?

15 A. That's right.

16 Q. But now that you have developed --

17 THE CHAIRMAN: And is that your current
18 policy? Is that your current -- as of today? I
19 recognize it is under consideration.

20 MR. VYROSTKO: That's correct.

21 THE CHAIRMAN: My technology ignorance
22 will probably betray itself, but is it not possible
23 that you could have something that doesn't get the
24 preferred premium but still qualifies for a NUG; is
25 that right?

1 In other words, the premium goes down to
2 zero but you still qualify as a NUG? Why? Because it
3 is producing some other product other than electricity?

4 MR. VYROSTKO: Typically, again based on
5 the efficiency, the higher the number the less
6 efficient it is, so the 10,000 Btu per kilowatthour
7 resembles a typical utility plant, a typical coal-fired
8 plant.

9 So as long as you were more efficient
10 than a traditional -- and in most cases it would be the
11 older plant. If you are more efficient than an older
12 utility plant, then you can get some of this
13 preference, and obviously that could be any NUG
14 project.

15 I can't think of any non-utility
16 generation project that would come in with an
17 efficiency higher than, which is worse than, one of our
18 existing facilities.

19 THE CHAIRMAN: I am still not quite sure
20 I understand.

21 Is there a possibility that some
22 developer could get a NUG project that isn't a major
23 supply NUG that is producing some product other than
24 electricity but still doesn't get a 10 per cent
25 premium?

1 MR. VYROSTKO: Yes.

2 THE CHAIRMAN: So there is a third kind
3 of NUG. I go back to what I talked about the other
4 day. There is a third kind of NUG. There may not be
5 one in existence now, but there is a possibility, at
6 least, of a third kind NUG?

7 MR. VYROSTKO: Yes, there is.

8 THE CHAIRMAN: But you can't think of any
9 specific example of one right now, as I understand it?

10 MR. VYROSTKO: Well, again, I guess at
11 this stage when we are -- if we look at the existing
12 rules that we have got with the sliding scale, then in
13 fact anywhere along the sliding scale you are a NUG and
14 you could get any portion of the preference. In fact,
15 you can get zero or you can get the full 10 per cent.

16 I think what we are looking at now is as
17 we move towards this new definition is whether in fact
18 there is a simple choice that says: If you qualify,
19 you are a NUG; if you don't qualify, you are not a NUG
20 and then you are a major supply.

21 THE CHAIRMAN: I am sorry, even though
22 you may be producing some product other than
23 electricity?

24 MR. VYROSTKO: Exactly. Yes.

25 MR. SHEPHERD: Q. Just let me clarify

1 one thing. You said if you qualify, you are a NUG; if
2 you don't qualify, you are not a NUG. But didn't we
3 hear you say yesterday that major supply NUGs are still
4 NUGs?

5 MR. VYROSTKO: A. Yes, and I said that.
6 You either are a NUG or you are not a NUG; then you are
7 a major supply NUG.

8 Q. The major supply NUGs are still NUGs?

9 A. Yes, they are. I meant to say you
10 are either a preferred NUG or not a preferred NUG. The
11 not preferred NUG disappears, and then you have got the
12 major supply NUG.

13 Q. I understand. All right. The sort
14 of test you are looking at to decide what's
15 cogeneration and what isn't, you are looking at heat
16 rates and things like that, efficiency right?

17 MR. BROWN: A. Yes. Some definition of
18 what high efficiency is.

19 Q. But as of right now when we are
20 looking at your forecast and we see numbers in there
21 for cogeneration, those numbers for cogeneration
22 include cogenerators that have a very small amount of
23 thermal load, don't they?

24 A. There is a portion in the technical
25 potential, yes, that is correct, where projects are

1 accepted by Ontario Hydro.

2 Q. And then that's also in the
3 achievable potential; right?

4 A. If we estimate those are going to
5 move forward, yes.

6 Q. But that's not going to happen in the
7 future now? Now, unless -- let's just use for
8 argument's -- let's say it has to be thermally matched.
9 I realize it won't be that tough a rule, but let's say
10 that was the rule.

11 If it's not thermally matched it just
12 won't be in your cogeneration numbers; right?
13 [12:30 a.m.]

14 A. My technical potential will be
15 reduced.

16 Q. Well, no. Let me --

17 A. I am removing a portion where a
18 generator is oversized.

19 Q. You have a project come in, your
20 thermally-matched number would be 100 megawatts of
21 electricity, the proposal is for 350 megawatts, do I
22 understand you to be saying that in your technical and
23 your achievable potential you will have 100 megawatts,
24 that portion would be cogen, and the other 350 will be
25 in major supply NUGs?

1 A. The 1990 NUG plan, if the proposal of
2 350 megawatts was accepted and under negotiation I
3 would put 350 megawatts, not 100 in the technical
4 potential.

5 Q. And in the achievable potential?

6 A. Yes.

7 Q. But now I am asking under this new
8 approach that you have decided on for major supply
9 NUGs, you are splitting it up; right?

10 A. Yes, future proposals. There is
11 already that are in the system.

12 Q. Okay, but a future proposal, you will
13 now only include in cogeneration the thermally-matched
14 cogeneration portion?

15 A. Yes.

16 Q. Do you have a breakdown of your
17 current achievable potential between what we might
18 characterize as real cogeneration and the sort of other
19 type of cogeneration; is that something you can
20 provide?

21 A. In the 1990 NUG plan?

22 Q. Well, no, in your current achievable
23 number.

24 A. From the 1990 NUG plan?

25 Q. No, you have a new number, don't you?

1 A. 3,100.

2 Q. Yes. And that's your achievable;
3 right? And it includes some cogeneration?

4 A. Yes.

5 Q. And in that cogeneration you have got
6 some projects that are not thermally matched?

7 A. There was the 650 that was referenced
8 before.

9 Q. Okay. And that 650, that's just the
10 component of the projects that you have in front of you
11 that is in excess of thermal matching?

12 A. That's correct.

13 Q. Okay. That 650 is all in-service and
14 committed; right?

15 A. No.

16 Q. Maybe I just misunderstood on
17 Tuesday. I will go back and look at the transcript.

18 DR. CONNELL: Have we had a definition of
19 thermal matching in the evidence? If not, would you
20 mind repeating it?

21 MR. SHEPHERD: We haven't, Dr. Connell,
22 and I changed the order of my questions and it is on
23 the next page, but maybe we can get to it now.

24 THE CHAIRMAN: Perhaps we should have it
25 now. Could one member of the panel give what they

1 understand thermal matching to be.

2 MR. BROWN: It's essentially a machine
3 that doesn't require a condenser, either air or water
4 condenser. All the waste heat, other than that which
5 goes up the chimney, is used for process. The
6 efficiency would be in the order of 80 per cent, or in
7 terms of heat rate, it would be around 5,000 Btu's per
8 kilowatthour.

9 THE CHAIRMAN: Eighty per cent
10 efficiency, is that what you are saying?

11 MR. BROWN: Yes.

12 THE CHAIRMAN: By the way, you use the
13 word "high efficiency" all the time when you are
14 talking about this particular cogeneration. Has that
15 got any other significance other than the -- what
16 significance does it have?

17 MR. BROWN: It is just that we are
18 getting proposals today, because of the low natural gas
19 prices, that are not high-efficiency cogeneration.

20 THE CHAIRMAN: What do you mean by "high
21 efficiency"?

22 MR. BROWN: All the waste heat is being
23 used for process.

24 THE CHAIRMAN: So that's the same as
25 thermal matching?

1 MR. BROWN: It's thermal matching, yes.

2 THE CHAIRMAN: You just said 650 and I am
3 looking at your overheard No. 18, what is the 650 you
4 are talking about?

5 MR. BROWN: 650 is included in the 1,800
6 and in the 340, the industrial sector and the gas
7 compressor station sector.

8 THE CHAIRMAN: I had down that you took
9 550 out of that 250 which would make 800; is that
10 right?

11 MR. SHEPHERD: That's what I had, too,
12 Mr. Chairman.

13 THE CHAIRMAN: 550 out of the 800 and 250
14 out of the 250.

15 MR. SHEPHERD: 240, actually.

16 THE CHAIRMAN: Anyway, that is a quibble.

17 Why didn't you include the 250 of the
18 major supply NUG in that 650, because isn't it a
19 cogeneration, technically a cogeneration project?

20 MR. BROWN: No, there is no cogeneration.

21 THE CHAIRMAN: No cogeneration at all?

22 MR. BROWN: No.

23 MR. SNELSON: Mr. Chairman, my notes
24 indicated that the 550 and the 240 were relative to
25 Figure 19 in that exhibit, and not Figure 18.

1 THE CHAIRMAN: I think you are right.

2 You are right. So it comes under the 2,650 and 365.

3 MR. SNELSON: That was what I had.

4 THE CHAIRMAN: All right. My question
5 really was about why there wasn't the 350 included.

6 MR. SHEPHERD: Q. Now, you have said
7 that that 650 is not proposals currently before you; is
8 that right?

9 MR. BROWN: A. No, those are proposals
10 that have accepted Ontario Hydro's rate offer.

11 Q. So, they are not technically
12 committed yet, but you have a deal? Not included in
13 your committed list because you haven't signed a
14 contract yet; right?

15 A. That's right.

16 Q. But they are the next step in front
17 of that, the financial terms have been agreed?

18 A. Well, the rate as one part of that
19 has been agreed to.

20 Q. Okay. And that 650 out of a total of
21 how much of in-service committed and rate deal, if you
22 like, cogeneration?

23 A. There is 731 in-service and
24 committed. This is in addition to that.

25 Q. Okay. So, then we are talking

1 about -- and 650 is only the excess over thermal
2 matching; right?

3 A. Yes. The NUG plan did forecast that
4 cogeneration would proceed. So, there is a forecast
5 over that period and this is above that.

6 Q. So then that is a very substantial
7 increase over thermal matching; isn't it?

8 A. The proposals are about five times
9 what I estimated them to be.

10 DR. CONNELL: Excuse me, what does over
11 thermal matching mean? Does that mean not thermally
12 matched?

13 MR. SHEPHERD: Yes, not thermally
14 matched. Moving farther and farther away from thermal
15 matching towards low efficiency.

16 DR. CONNELL: More than 5,000 or more
17 than 6,000?

18 MR. BROWN: These are more likely
19 combined cycle plant in the order of 8,000.

20 MR. SHEPHERD: Q. So I had understood
21 your evidence on Tuesday, and I guess obviously I
22 misunderstood it, I had understood it to say that you
23 had 1,000 megawatts of proposals more than you expected
24 of which 650 were cogeneration and 350 were major
25 supply NUGs. But as I understand what you are saying

1 now, the whole 1,000 is in essence, major supply NUGs,
2 right, because the 650 has nothing to do with thermal
3 load at all. It's strict electricity; isn't it?

4 MR. BROWN: A. That's true.

5 Q. And so is the 350 that's already on
6 that list?

7 A. Yes.

8 Q. So this whole 1,000 megawatts is
9 simply combined cycle fossil, no heat load?

10 A. That's correct.

11 Q. I take it it's because you got this
12 1,000 megawatts that you said, well, we better stop
13 doing this because this is becoming a lot of
14 conventional fossil, more than we want; is that right?
15 We better start to look at it differently; is that
16 fair?

17 MR. SNELSON: A. I think we were
18 beginning to recognize that we had sufficient capacity
19 from preferred options to meet our 1990's need, and
20 that if we took on more of this type of option, then we
21 would have to cut back somewhere on else on things that
22 we did not wish to cut back on, such as the thermally
23 matched cogeneration and the small Hydro and so on.

24 Q. Is it fair to say that the
25 environmental benefits of low-efficiency cogeneration

1 projects, 8,000 heat rate and things like that, are not
2 as much as high-efficiency cogeneration projects, real
3 cogeneration?

4 A. Our reason for referring the
5 high-efficiency cogeneration is because we think that
6 it's resource use and environmental characteristics,
7 social characteristics, make it preferred. And as you
8 move away from that and become closer to a major supply
9 option, then a combined cycle plant built by a
10 non-utility generator is the same as a combined cycle
11 plant built by Ontario Hydro, in essence.

12 Q. So, it has advantages over, say, a
13 coal plant perhaps, but it doesn't have any advantage
14 over -- it has a disadvantage as compared to real
15 cogeneration; right?

16 A. It doesn't have much of an
17 improvement compared to the high-efficiency cogen, and
18 when you come to the gas-fired plant versus the
19 coal-fired plant, then they have different impacts, and
20 there are some that go one way and some that go the
21 other.

22 Q. Is it fair to say that the best
23 reference point to use, if you had to use a
24 generalization for the environmental impact of gas
25 combustion is heat rate?

1 A. Heat rate is certainly a very good
2 indicator of the use of fuel, and whether that's also
3 an indicator of environmental impact depends on how
4 that fuel is burned.

5 Q. All other things being equal, as the
6 heat rate goes down, the environmental impacts are
7 less; right?

8 A. Presuming the fuel is burned in as
9 efficient a way and with the same degree of
10 environmental control, then the less fuel you burn then
11 the less carbon dioxide and so on.

12 Q. And that's what heat rate controls;
13 right?

14 A. Yes.

15 THE CHAIRMAN: I hate to back up again,
16 but do I understand the evidence now is that the entire
17 1,000 additional megawatts, none of it is cogeneration;
18 is that right?

19 MR. BROWN: There is an element of
20 cogeneration. In the president's speech we mentioned
21 1,200 megawatts of the NUG proposals, and what we are
22 saying is that 1,000 megawatts is not cogeneration.

23 THE CHAIRMAN: So, the 650 and the 350,
24 which go to make up the extra 1,000, none of that is
25 cogeneration?

1 MR. BROWN: It's not cogeneration but the
2 650 is included in cogeneration facilities. So you
3 really have projects, a cogenerator and a major supply
4 NUG as one plant. It was trying to separate the two
5 out.

6 THE CHAIRMAN: That's what I am trying to
7 follow. Why is the 650 listed under cogeneration when
8 it in fact is not cogeneration?

9 MR. SHEPHERD: Can I help, Mr. Chairman.

10 THE CHAIRMAN: No, I think I would like
11 Mr. Brown to answer because he is the one that I have
12 to get it from.

13 MR. BROWN: In the pure sense of the word
14 they are cogeneration because there is steam being used
15 for process; it is just a very small part. The
16 efficiency is very low.

17 THE CHAIRMAN: It could be called
18 technical cogeneration, is that what you are really
19 saying?

20 MR. BROWN: It is included in the
21 technical cogeneration.

22 THE CHAIRMAN: But not substantial
23 cogeneration?

24 MR. BROWN: No, it's not the high
25 efficiency.

1 DR. CONNELL: I wonder if it would help
2 to recast your page 18 then, with a little bit of
3 sorting out of the cogeneration class, to subdivide the
4 1,800 and presumably some part of the 340, too, which
5 are not high efficiency.

6 [12:45 p.m.]

7 MR. BROWN: Included in the 1,800s that's
8 called technical potential -- or, sorry, attainable
9 potential on page 18, in the industrial cogeneration
10 there is 410 megawatts that we would call major supply.

11 In the compressor gas station, there are
12 240 megawatts that we will call major supply and,
13 obviously, the major supply NUG, 350s -- all 350.

14 MS. PATTERSON: So what happens to the
15 other 140 between the 550 and the 410 that comes out of
16 your 1,800?

17 MR. BROWN: That is already in the 1990
18 NUG plan.

19 THE CHAIRMAN: They're just having a
20 conference over there.

21 MR. BROWN: Sorry. To get from 1,250 to
22 the 1,850.

23 THE CHAIRMAN: I'm sorry.

24 MR. BROWN: I'm sorry, from 1,250 to
25 1,800, the majority of that, the 410, is major supply.

1 The difference would be additional that would be
2 included in the next forecast.

3 THE CHAIRMAN: I'm sorry, the additional
4 would be what, I'm didn't hear you.

5 MR. BROWN: The additional would be new
6 proposals that have gone ahead, and those would be
7 high-efficiency cogeneration.

8 MS. PATTERSON: So is the 410 one
9 facility?

10 MR. BROWN: It's several facilities.

11 MS. PATTERSON: Several.

12 MR. SHEPHERD: Q. Mr. Brown, I think you
13 may have succeeded in confusing me too, so I'm going to
14 ask you, if we take the 1,250 to the 1,800, that
15 difference is 550; correct?

16 And that 550 is projects, several
17 projects, each of which has an element which is
18 thermally matched cogeneration and an element which is
19 just electrical add-on overcapacity?

20 A. (nodding affirmatively)

21 Q. And do I understand you to be saying
22 that the portion of that 550, which is the aggregate of
23 all those electrical add-ons is 410?

24 A. That's the major supply part, yes.

25 Q. Okay. And similarly, where you go

1 from the 100 to the 340, the 100 is a matching of
2 electrical and non-electrical loads; right?

3 A. (nodding affirmatively)

4 Q. But the proposals you got were all
5 overcapacity, or many of them were overcapacity for the
6 non-electrical load?

7 A. That's correct.

8 Q. So, you're saying that there's still
9 100 in that 340 which is the matched portion, but
10 you've now got another 240 which is really major
11 supply?

12 A. Yes.

13 Q. And as I understand what you were
14 saying earlier, you're now going to start treating
15 these major supply amounts separately?

16 A. They will not be in the next plan,
17 the forecasts of them.

18 Q. Does that mean that 650 is going to
19 come out--

20 A. No, no, it's still included.

21 Q. --or just the new ones?

22 A. Once they're signed up we put them
23 in, but when I did a forecast I would be looking for
24 the efficient ones in the future.

25 Q. Okay. Are you going to be reporting

1 this in such a way that the overcapacity, if you like,
2 the additional electric in cogeneration projects is
3 listed under major supply NUG; is that what you're
4 telling us, or is it still going to be listed under
5 cogen?

6 A. It will go in the cogen section just
7 likes it's shown here.

8 Q. Okay. The original 1,250 you had,
9 that also included some major supply NUGS too; didn't
10 it?

11 A. In the technical potential it did.

12 Q. Not in the achievable potential?

13 A. None of these were forecast to be
14 achievable.

15 Q. So you didn't have any projects at
16 that time that were less than high-efficiency projects
17 that you were expecting to achieve?

18 A. Yes.

19 Q. You did, or yes, I'm right?

20 A. No, the forecast only had a high
21 efficiency.

22 Q. So if it wasn't high efficiency you
23 assumed it wasn't achievable?

24 A. That's right.

25 THE CHAIRMAN: Well then, one of the

1 reasons in addition to the change in gas prices for
2 getting this 1,000 extra is that you're prepared to put
3 non-preferred NUGS into this particular mix, where
4 before you weren't; is that right?

5 MR. VYROSTKO: Originally, in both the
6 '89 and the 1990 NUG plan we, in fact, recognized that
7 there may be projects submitted as non-preferred or the
8 low-efficiency cogenerators, but we never thought that
9 they would be economic.

10 So we would accept them as a proposal and
11 we would, in fact, continue to negotiate them and if
12 they, in fact, became economic they would.

13 As it turned out, a number of these,
14 because of the changing gas prices, became economic.

15 DR. CONNELL: I have one further question
16 about the compressor stations. If I understand the
17 numbers then, 100 megawatts would actually be driving
18 turbines with compressed gas and the other 240 would
19 represent combustion at those sites; is that correct?

20 MR. BROWN: There will be combustion
21 turbines used exclusively for electricity. That would
22 be in the additional 240, that wouldn't be required
23 normally.

24 DR. CONNELL: Oh yes, I see. Yes, it's
25 the other type I was thinking of.

1 MR. SHEPHERD: Q. Just out of curiosity,
2 is it actually separate turbines or is it bigger
3 turbines using the compressed gas and other natural gas
4 together?

5 MR. BROWN: A. The design typically is a
6 combustion turbine to drive the compressor on one side
7 and other gas turbines as well producing electricity.
8 The waste heat from all of those turbines goes into a
9 heat recovery boiler and used for steam.

10 Q. So the economy of scale is that the
11 heat recovery boiler services both?

12 A. Yes.

13 Q. In the 1990 NUG plan, you say that
14 the technical potential for cogeneration in total is
15 14,382 megawatts; is that correct?

16 A. 14,382.

17 Q. Okay. And then I was looking - and I
18 just want to clear this up because I want to make sure
19 that my overhead is right this afternoon - I was
20 looking in the supplementary witness statement, page 7,
21 paragraph 23, it says:

22 "The 1990 estimate of the technical
23 potential for non-utility generation is
24 15,312."

25 That's not correct; is it?

1 A. It should be the value that is in the
2 NUG plan, 14,382.

3 Q. Okay. My calculation is that the
4 15,312 is the combination of cogeneration and other
5 thermal. Can you confirm that that's correct?

6 A. That is correct.

7 Q. Okay. Can you turn to page 8 of the
8 supplementary witness statement. It says in paragraph
9 28 -- this has really, especially after this discussion
10 we have just had, this has really got me confused.

11 "The estimate of technical potential
12 which will be produced for the 1991 NUG
13 plan is currently...", and we're talking
14 about cogeneration now,

15 "...is currently expected to increase
16 by over 1,400 megawatts due to increases
17 in the technical potential of industrial
18 cogeneration gas compressor stations.

19 These increases in technical potential
20 are mainly due to increases in the size
21 of project proposals."

22 Can you relate that to the 550 and the
23 240 we were just talking about, or the 410 and the 240,
24 sorry?

25 A. First of all, these are proposals

1 that have been received since the NUG plan was issued
2 last year.

3 Q. Yes.

4 A. Some of the 540 and the 240 is from
5 old proposals and some of it is from new proposals. So
6 there is an element in this 1,400 that is part of the
7 new 1,000.

8 Q. No, but here's what I'm asking.

9 THE CHAIRMAN: I'm sorry, what paragraph?
10 I was looking at paragraph 28.

11 MR. SHEPHERD: Sorry, 28 on page 8.

12 THE CHAIRMAN: 28 on page 8.

13 MR. SHEPHERD: Q. This is an increase in
14 technical potential; right, 1,400 megawatts?

15 MR. BROWN: A. Yes.

16 MR. SNELSON: A. I think there may be an
17 error there. At page 8 there appear to be two
18 paragraph 28s.

19 THE CHAIRMAN: Oh yes. I was looking at
20 the wrong paragraph 28.

21 MR. SNELSON: I think it is, the first
22 one probably should be -- well...

23 MR. SHEPHERD: No.

24 MR. SNELSON: No, I think their numbering
25 is unusual.

1 MS. PATTERSON: Or 27A.

2 MR. SHEPHERD: B.

3 MR. CAMPBELL: I think it should have a
4 27A and 27B, by the looks of it.

5 MR. SHEPHERD: I'm not going to try to
6 figure it out.

7 THE CHAIRMAN: Well, anyway, you're
8 looking at the --

9 MR. SHEPHERD: The bottom paragraph.

10 THE CHAIRMAN: I was looking at the wrong
11 28, so that's why I couldn't follow the discussion.

12 MR. SHEPHERD: Q. Okay. So the bottom
13 paragraph says:

14 "Technical potential is expected to
15 increase by 1,400 megawatts."

16 I think the thing I'm trying to
17 understand here is, that if your technical potential
18 was set up, based on thermal matching - and you've told
19 us all the projects now, you've told us the totals of
20 excess over thermal matching that's gone into your
21 numbers, which is 650 - then what's the 1,400?

22 MR. BROWN: A. There are additional
23 proposals.

24 Q. Which you're now saying are in
25 technical potential, but you don't believe that they're

1 achievable?

2 A. Some of this 1,400 is included in the
3 1,000 as achievable.

4 Q. And that's the 650; right?

5 A. That's part of the 650.

6 Q. Part of it, okay.

7 A. We had proposals before that were
8 already in the 1990 NUG plan that also make up some of
9 the 1,000.

10 Q. Is this 1,400 megawatts also a
11 thermal matching question?

12 A. These are not thermal matched plants.

13 Q. All right. So the additional 1,400
14 megawatts you've got is because you're getting
15 proposals in that aren't thermally matched, they're low
16 efficiency; right?

17 A. That's correct.

18 Q. So the additional proposals you're
19 getting in that are low efficiency isn't the 650 you've
20 have included in achievable, it's the 1,400 you've
21 included in technical; right?

22 A. 1,400 is new proposals since last,
23 say, October until, say, end of July, August. So,
24 since the NUG plan was done 1,400 megawatts of
25 proposals have come in, 1,400 megawatts above what I

1 thought was estimated in the 1990 NUG plan.

2 Q. So above thermal matching?

3 A. Right.

4 Q. Is that right?

5 A. Yes. And some of those are included
6 in the 1,000.

7 Q. And the 650?

8 A. Yes.

9 THE CHAIRMAN: In the future I understand
10 you're not going to include major supply NUGS until
11 they become committed in your attainable; is that
12 right?

13 MR. BROWN: That's correct.

14 THE CHAIRMAN: How do you deal with them
15 in the potential?

16 MR. BROWN: Since -- I only put them in
17 my technical potential when they're accepted as a
18 proposed project by Hydro. These no longer will be
19 accepted.

20 THE CHAIRMAN: I see. And then committed
21 moves them into the attainable; is that the way it
22 works?

23 [1:00 p.m.]

24 MR. BROWN: Yes.

25 MR. SHEPHERD: Mr. Chairman, this might

1 be a very good time to have lunch.

2 THE CHAIRMAN: Adjourned until 2:30.

3 THE REGISTRAR: We will adjourn until
4 2:30.

5 ---Luncheon recess at 1:02 p.m.

6 ---Upon resuming at 2:35 a.m.

7 THE REGISTRAR: Please come to order.
8 The hearing is again in session. Be seated, please.

9 THE CHAIRMAN: We are going to stop
10 around 4:00 this afternoon; therefore, we won't need to
11 have a break. We will just go through until 4:00 and
12 then stop.

13 MR. B. CAMPBELL: Mr. Chairman, Dr.
14 Connell made a suggestion which I think I am going to
15 do what I really swear from time to time I never do,
16 which is volunteer for an undertaking.

17 Various numbers have been talked about in
18 sort of six different cuts, looking at them this way,
19 that way, three or four or five, a number of different
20 ways, and sitting here myself when I have seen some of
21 the confusion it has been because somebody is asking a
22 question cutting one way and answering a question
23 cutting another way, or vice versa, or combinations of
24 all of that.

25 I think what I am going to ask the Panel

1 to do, if they can over the weekend but certainly for
2 filing sometime next week, is to break down the numbers
3 a little bit more, and then do it from several of these
4 different cuts so that we can all sort of say, okay, if
5 you are looking at it this way here is how the numbers
6 add up; if you are looking at it from this perspective
7 the numbers juggle a little differently. I guess the
8 totals are all the same, but it is just the different
9 cuts have seemed to be a problem.

10 So I am volunteering and undertaking to
11 do that in the hope that it might be of assistance to
12 people and assuming that my witnesses won't throttle me
13 at some appropriate or inappropriate time later.

14 So if you think that would be helpful...
15 If I could get a number for that, I think it might be
16 helpful.

17 THE CHAIRMAN: There isn't another
18 significant baseball game until next Tuesday, so that
19 gives...

20 THE REGISTRAR: 322.8.

21 MR. B. CAMPBELL: Thank you.

22 ---UNDERTAKING NO. 322.8: Ontario Hydro undertakes to
23 further break down the numbering
24 system for ease of reference.

24 MR. SHEPHERD: I am glad we accepted Mr.
25 Campbell's volunteered undertaking. I wouldn't want to

1 establish a practice of declining to accept his
2 voluntary statements.

3 Q. Mr. Brown, just before lunch I think
4 we got to - and maybe you can confirm - that in the
5 3,100 megawatts is 1,000 megawatts of this
6 non-preferred major supply NUGs; is that right?

7 MR. BROWN: A. Yes.

8 Q. So 1,000 megawatts is the right
9 figure?

10 A. Yes.

11 Q. I had understood you to say on
12 Tuesday - maybe I misunderstood - that you considered
13 the natural gas component of wood waste to be major
14 supply NUG as well; isn't that correct? Unless it --

15 A. Yes, that's right.

16 Q. So you have a 300 megawatt attainable
17 for wood waste, including natural gas; correct?

18 A. (Nodding).

19 Q. So, 250 megawatts of that is also
20 really major supply NUGs; is that correct?

21 A. Yes.

22 Q. So we have a total then, of the 3,100
23 megawatts, 1,250 is major supply NUGs; is that correct?

24 A. Yes, to include that component on the
25 gas, of wood waste.

1 Q. So, is that now the absolute total?
2 There is no more in there anywhere?

3 THE CHAIRMAN: By that, you mean major
4 supply NUGs?

5 MR. SHEPHERD: That's right.

6 MR. BROWN: Those are the only areas.

7 MR. SHEPHERD: Q. Just a little aside,
8 we talked in Panel 2, and I maybe even referred to it
9 yesterday, about steam process derating? Can you
10 remind us of what steam process derating is?

11 MR. BROWN: A. When a cogenerator is
12 producing steam for process it usually generates the
13 steam to meet the demand of that steam and the
14 electricity is a by-product, and the steam demand
15 throughout a year is not constant.

16 So what we have seen is the cogenerators
17 aren't running at 100 per cent of their rating.
18 They're actually following the steam demand of the
19 process. This is very noticeable in the summer when
20 you lose a lot of heating load at a large industrial
21 plant and therefore the generator has to back down.

22 Q. Now, I think it was you, Mr.
23 Vyrostk, wasn't it, who made the recommendation to
24 Power Systems Operations Division to use a 10 per cent
25 steam process derating for NUGs?

1 MR. VYROSTKO: A. My division makes that
2 recommendation.

3 Q. Is it to you that I should address
4 questions about it?

5 A. No, to Mr. Brown.

6 Q. Okay, Mr. Brown. So, is it correct
7 that in 1990 you recommended to PSOD that they use a 10
8 per cent steam process derating as an average for all
9 cogeneration?

10 MR. BROWN: A. This number is used by
11 System Planning, Power System Operations.

12 Q. Oh, okay. All right. Now, at that
13 time when you made that recommendation that was an
14 average for all cogeneration; right?

15 A. Yes.

16 Q. Okay. At that time your NUG plan
17 assumed absolute thermal matching of all cogeneration;
18 is that correct?

19 A. Yes.

20 Q. You don't have that now; right?

21 A. In future plans, that's correct.

22 Q. So your current numbers for
23 cogeneration, what we have seen, you don't have thermal
24 matching. You are quite a ways away from it; correct?

25 A. The numbers that were provided were

1 just for cogeneration, and we didn't have these major
2 supply NUGs and large cogenerators at that time, and
3 this year when we provided input to System Planning -
4 it's an annual process - we will be looking at the
5 numbers to be used for such facilities.

6 Q. So can I assume that your new steam
7 process derating on average will have to go down?

8 A. Yes, for those types of facilities.

9 Q. Do you have any idea what sort of new
10 number you are going to use now?

11 A. Not really, because we still don't
12 have any evidence, so...

13 Q. Well, you know that a major supply
14 NUG has a zero steam process derating; correct?

15 A. That's correct.

16 Q. And you know that a certain
17 percentage of your cogeneration is really major supply
18 NUGs; correct?

19 A. Yes, it has to be a number between 80
20 and 90, and we are not sure of the number right now.

21 Q. What has to be a number between 80 --

22 A. For this element of cogeneration. It
23 includes major supply.

24 Q. I don't understand. Your steam
25 process derating was 10 per cent?

1 A. Right.

2 THE CHAIRMAN: Does that mean it is a
3 number of 90 or --

4 MR. BROWN: There is a 5 per cent forced
5 outage and a 10 per cent planned outage which would
6 take you to 90 for just a conventional generator.

7 THE CHAIRMAN: So when you are talking
8 numbers 80 to 90, you are meaning in Mr. Shepherd's
9 terms 20 per cent to --

10 MR. BROWN: 10 per cent.

11 THE CHAIRMAN: 10 per cent, okay.

12 MR. SHEPHERD: Q. And the steam process
13 derating is currently half of the 20 per cent you use
14 as unreliability, incapability factor?

15 MR. BROWN: A. Yes.

16 Q. And so we can assume that that 20 per
17 cent is now going to go down?

18 A. For those facilities, yes.

19 Q. Well, for the --

20 A. We have to provide two forecasts.
21 There are two different types of technologies out
22 there.

23 Q. So then, for the major supply NUGs
24 you are not going to have any steam process derating;
25 isn't that true?

1 A. Yes.

2 Q. So then the incapability factor will
3 be 10 per cent; is that right?

4 A. If the other two factors remain
5 constant.

6 Q. Then, for cogeneration, now that you
7 have adjusted it so that it is necessarily thermally
8 matched, you will stay with a 20 per cent incapability
9 factor?

10 A. Yes, that's true.

11 Q. Okay. And if you have a lower
12 incapability factor does that mean that NUGs are
13 modelled as being more reliable?

14 A. There would be more energy production
15 from those. The number is used to determine energy.

16 Q. Well, I was under the impression that
17 in the frequency and duration model and in the - maybe
18 you can correct me if I am wrong, Mr. Snelson - in the
19 consistent energy set, and in...I don't even remember
20 the name of it, LMSTM, all of those use the 80 per
21 cent, don't they?

22 MR. SNELSON: A. The figures that go
23 into those models may be different. In point of fact,
24 at the moment they could be the same, but the reason
25 they might be different is that they are doing

1 different things.

2 LMSTM, in a technology that's a
3 non-dispatchable technology, needs to have a definition
4 of the availability and the energy production that's
5 going to come from it, which really defines the
6 capacity factor, and so, an 80 per cent used in LMSTM
7 is an 80 per cent capacity factor in that case.

8 Q. Yes?

9 A. And although I am not so familiar
10 with it, I would presume that the same is true of the
11 consistent energy set, which is principally an energy
12 model rather than a capacity model.

13 The figures that go into frequency and
14 duration are intended to model reliability at times of
15 severe system stress, and in this particular case if
16 they are -- if there is no control of the capacity,
17 then it may very well be that we would use the same
18 number and we would use reliability indices for
19 availability rather than capacity factor.

20 Q. Okay.

21 A. Sorry, I may have confused you there.

22 Q. No, no, I understand. I say so; I
23 don't know.

24 But I take it it's true, then, that we
25 have got 1,250 megawatts that we know is going to --

1 well, at least it's going to have a 10 per cent change
2 in its incapability factor. It might have some
3 offsetting change as well, we don't know that yet, but
4 we at least know there is that 10 per cent change, and
5 that will affect the running of LMSTM and CES; isn't
6 that correct.

7 A. If those numbers are changed, when
8 these additional options are put in, yes, it will --

9 Q. And it treats that 1,250 megawatts as
10 10 per cent more reliable; right?

11 A. 10 per cent more energy production.

12 Q. Fair enough. Okay. I promised
13 myself I wouldn't even mention CES and LMSTM in Panel
14 5, but I broke my promise.

15 Mr. Brown, can we go back to the
16 technical potential for industrial cogeneration? What
17 I have done, you will see that I have provided the
18 first four pages of our overheads: the three
19 embarrassing supply curves, and then a fourth, which is
20 the overhead that I am putting up now.

21 Mr. Chairman, as we discussed earlier, I
22 will be filing Exhibit 326 on Monday morning which will
23 include all of the overheads and the document precis.
24 This is just a piece of paper right now--

25 THE CHAIRMAN: All right.

1 MR. SHEPHERD: --with numbers on it.

2 Q. I am just leaving this up, Mr. Brown,
3 for reference, I am going to come back to it a number
4 of times as I try to figure out what the numbers are.
5 This is page 4 of Exhibit 326.

6 The technical potential number for
7 industrial cogeneration in 1990 was 7,882; correct?

8 MR. BROWN: A. Yes, it was.

9 Q. And it is now 9,042?

10 A. That's our preliminary estimate right
11 now.

12 Q. Okay. The major basis of your
13 forecast for industrial cogeneration technical
14 potential, if I understand, is a study done about
15 fifteen years ago that is usually referred to as
16 Leighton and Kidd?

17 A. Yes, that's a good portion of it.

18 Q. And that study contains a complete
19 inventory of all available industrial steam hosts in
20 the province?

21 A. All of those that responded to the
22 survey.

23 Q. But, of course, it doesn't include
24 any steam hosts below 40,000 pounds per hour, does it?

25 A. That was our criteria. I believe

1 that was it.

2 Q. And 40,000 pounds per hour is a lot
3 of steam, isn't it? It's a pretty major load?

4 A. It's steam.

5 Q. Well, can you give us a sense of
6 whether we are talking about the amount of steam from a
7 kettle or the amount of steam at Inco?

8 A. I am comparing it to some of the
9 larger sites that are 100,000, 200,000, 300,000.
10 40,000 is not significant, comparing to those.

11 Q. Okay. I will come back to that in a
12 second.

13 You have taken, as I understand it -- and
14 correct me if I am wrong - you have taken the Leighton
15 and Kidd totals, which are steam load totals; correct?

16 A. Yes.

17 Q. They are numbers for steam loads?
18 You have calculated the thermally matched electricity
19 output; correct?

20 A. Yes.

21 Q. You have then added in actual project
22 proposals from sites not included in Leighton and Kidd?
23 [2:50 p.m.]

24 A. That's correct.

25 THE CHAIRMAN: You say not included,

1 sites not included?

2 MR. SHEPHERD: Not included from Leighton
3 and Kidd.

4 Q. You have added the over-developed
5 portion of site proposals that you have received in
6 Leighton and Kidd sites; correct?

7 MR. BROWN: A. Yes.

8 Q. And then you get a total, which is
9 the 7,882?

10 A. That's right.

11 Q. Which is now, because of all those
12 over-developed proposals, is now 9,042?

13 A. It has an increased, yes.

14 Q. Okay. Actually, that can't be right.
15 No, that's right.

16 Now, the first thing I guess I wonder,
17 that study is fifteen years old; correct?

18 A. That's correct.

19 Q. And the industrial base in Ontario
20 has experienced growth in the last fifteen years?

21 A. We had another survey done in 1988
22 which we referenced, it's the Seawright study, and that
23 study of the same sites showed a decrease of 14 per
24 cent.

25 THE CHAIRMAN: Showed a decrease?

1 MR. BROWN: On average it was 14 per cent
2 less.

3 MR. SHEPHERD: Q. I thought the Ontario
4 economy was growing including the industrial sector.
5 Do you have any idea why we have a decrease?

6 MR. BROWN: A. This is only looking at
7 the steam. The economy could be growing in a lot of
8 other areas that are maybe more electrical intensive
9 and not using steam.

10 Q. The Seawright study didn't look at
11 whether there were new sites that hadn't been included
12 in Leighton and Kidd, did it?

13 A. It identified new sites as well.

14 Q. But then its criteria were over
15 100,000 pounds per hour; right?

16 A. It was major boilers.

17 Q. Okay. And didn't you just say that a
18 100,000 is the sort of big ones, that's the very large
19 ones; right?

20 A. That's the typical size of an
21 industrial cogenerator, 100,000 or higher.

22 Q. 100,000 is typical?

23 A. Yes.

24 Q. Well, isn't it true that in the
25 Seawright study it was determined that there were only

1 73 sites in Ontario that had 100,000 or more?

2 A. There was a differently of
3 methodology used in that study. It wasn't as
4 comprehensive as the Leighton and Kidd study which is
5 why we still go back to Leighton and Kidd study
6 information.

7 Q. Leighton and Kidd only identified 188
8 sites; correct?

9 A. Something like that.

10 Q. And Seawright only identified 73
11 sites?

12 A. The Leighton and Kidd had the same
13 site, it would break it up into different facilities.
14 So I am not sure if it's 188 sites. The Seawright
15 study said, this a site and here is all the boilers in
16 it, whereas Leighton and Kidd when it went into a site,
17 you could have three or four different facilities
18 there.

19 Q. Oh, so the 188 in Leighton and
20 Kidd -- is it Leighton and Kidd or Laten and Kidd
21 (phoen.)?

22 A. I am not sure of the pronunciation.
23 I never met the man.

24 Q. So, the 188 in that study might
25 actually be more than the number of businesses or the

1 number of factories that you could put cogen at?

2 A. Yes.

3 Q. Are you confident that all of the -
4 did I ask this already - are you confident all of the
5 new studies have been identified through Seawright?

6 A. No. That is why when we take
7 proposals, we will add those to our data base as they
8 come in.

9 Q. But there might also be some more out
10 there that you don't know about?

11 A. That's quite possible.

12 Q. I guess one of the things Seawright
13 determined, didn't it, because it looked like the
14 Leighton and Kidd sites, that on average they didn't
15 have a larger thermal load than they used to have.
16 They haven't grown in size and have more thermal
17 requirements?

18 A. There was no evidence to support
19 that.

20 Q. Okay. Is it true that cogeneration
21 technology has progressed in the last fifteen years?

22 A. I think in application it has.
23 Combustion turbines have been around for a long time.

24 Q. This sounds like - and maybe you can
25 correct me if I am wrong - one would think if you are

1 working mainly from fifteen-year-old data that you
2 might have a problem with out-of-date information. Is
3 that a problem for you?

4 A. That's why we did the Seawright study
5 in 1988, was try and redo this data, and when Seawright
6 himself went to do the study, he found that he couldn't
7 do the same process that Leighton and Kidd did. His
8 information was based on manufacturers information, not
9 from the user.

10 Q. In fact, Terry Seawright, when he
11 proposed that he would do that, said that there were, I
12 think, four sources of information he wanted to go to;
13 isn't that right?

14 A. Yes.

15 Q. And ultimately he only got
16 information from the boiler manufacturers?

17 A. That's right.

18 Q. And didn't he tell you then that as a
19 result of the limited information, that there was
20 concern about the reliability of the data he produced?

21 A. Yes, that's true.

22 Q. What steps have you taken to rectify
23 that problem, either to fully update Leighton and Kidd,
24 or to do a further resource assessment or site
25 analysis?

1 A. I update my resource assessment every
2 year based on new project information.

3 Q. Which would tell you a lot about
4 achievable potential but we are talking about technical
5 potential.

6 A. No, I am talking about people who are
7 proposing projects. That's not really all achievable.
8 Everybody who comes in and is interested in a project,
9 we try to get information to update our resources.

10 Q. Okay. But you haven't actually gone
11 out into the field except the attempt with Seawright
12 which don't work very well, you have haven't gone out
13 in the field and tried to see whether you could get a
14 real broad data base of what was out there for cogen?

15 A. No. We continue to update our own
16 bases as projects come in.

17 Q. Do you have any plans to do that, to
18 up late Leighton and Kidd, for example?

19 A. I have talked to the people who have
20 the site locations and they say they still will not
21 release that information.

22 Q. How did Leighton and Kidd do it?

23 A. They got information from, I am not
24 sure what part of the government, who have a list of
25 all boilers who are required to have stationary

1 operators, and then they surveyed every one of those
2 and the information was obtained from them.

3 Q. And when Seawright went to do it the
4 government wouldn't give them the information?

5 A. That's correct.

6 Q. Have you made any attempt to get that
7 information from the government recently?

8 A. As I mentioned to you, I did contact
9 them last year and I got the same response Seawright
10 did.

11 Q. That is the government won't provide
12 that list?

13 A. I have talked to Ministry of Energy
14 about it and they say they will try and cooperate with
15 me, but I still don't have any information.

16 Q. If you did have that list, would it
17 be possible to replicate Leighton and Kidd with current
18 data?

19 A. Maybe we could follow the same
20 process, that would something I would be looking for.

21 Q. That would be valuable information
22 for you?

23 A. Yes.

24 Q. Now, you said that Leighton and Kidd
25 looked at only a small number of bigger sites, correct,

1 188, which is actually less than 188 of the larger
2 sites; is that fair?

3 A. I am not sure how many responded.
4 They had a complete list they sent a survey to, I
5 believe, it was 75-80 per cent responded.

6 Q. But surely of they are more than 188
7 factories and other businesses in the industrial sector
8 in Ontario that use heat or steam?

9 A. That's possible, yes.

10 Q. There are thousands, aren't there?

11 A. Well, 188 was a total over 40,000
12 pounds.

13 Q. Yes. But if you got rid of the
14 40,000 pound restriction, we would be talking about
15 thousands of thousands; wouldn't we?

16 A. Well, I think now you are getting
17 into the institutional commercial sectors, and there
18 are thousands and thousands in that area.

19 THE CHAIRMAN: Could I put the 40,000 in
20 perspective? Based on that criteria is there any
21 threshold that you or would not consider as a proposal?

22 MR. BROWN: No.

23 THE CHAIRMAN: You would consider 10,000,
24 would you, or 5,000?

25 MR. BROWN: When we get into the smaller,

1 like package cogen, it's quite significantly less than
2 40,000. 40,000 is only a number because that's when
3 you need a licenced operator.

4 THE CHAIRMAN: So there would be quite a
5 few less than 40,000 in the Province of Ontario.

6 MR. BROWN: Yes. And in the commercial
7 and institutional sectors there are a lot, and a lot of
8 that is below 40,000.

9 THE CHAIRMAN: So you had to make some
10 assumptions when you were doing your forecasting of how
11 many there were, I suppose.

12 MR. BROWN: In the industrial sector?

13 THE CHAIRMAN: Less than 40,000.

14 MR. BROWN: Our assumption was there
15 wasn't any.

16 THE CHAIRMAN: I see.

17 MR. SHEPHERD: Q. So your assumption was
18 there were no factories in the Province of Ontario with
19 a steam load of less than 40,00?

20 MR. BROWN: A. That's our assumption,
21 yes.

22 Q. Do you believe that's true?

23 A. There are probably some out there.
24 The ones that are proceeding are the larger ones right
25 now.

1 Q. No. All I am trying to determine is
2 we are talking technical potential now. Is the reason
3 why there aren't any under 40,000, or you are assuming
4 there are none under 40,000, is because you assume they
5 are uneconomic or because you assume they just aren't
6 there at all, they don't exist?

7 A. We haven't looked at that sector.

8 Q. You haven't looked at it at all?

9 A. No.

10 THE CHAIRMAN: Just so I don't get away
11 from this, what basis do you make the assumption of
12 40,000? What is the foundation for that assumption?

13 MR. BROWN: There is a parameter Leighton
14 and Kidd use, and the only reason it came up was the
15 people that had the list of sites of licenced
16 operators, it only required them to have over 40,000.
17 So all the people under 40,000 are unlicenced and most
18 people don't even know who they are unless it's a
19 boiler manufacturer or something.

20 THE CHAIRMAN: But making a forecast of
21 what is potentially technically available, you feel
22 comfortable making that assumption, I take it?

23 MR. BROWN: It's not a significant part
24 of my potential. When grab the industrial sector over
25 40,000, to us that was the most significant part of

1 that area.

2 THE CHAIRMAN: In other words, less than
3 that is insignificant in your calculations?

4 MR. BROWN: That's right.

5 THE CHAIRMAN: All right.

6 MR. SHEPHERD: Q. Is it insignificant
7 because the number of megawatts is smaller or is it
8 insignificant because you don't think any of it is
9 going to be achievable anyway?

10 MR. BROWN: I think it is small in terms
11 of megawatts and inachievable as well.

12 Q. All right. Just give us a ballpark,
13 will you, assume, a thermally-matched project with a
14 load of 20,000 pounds per hour, how many megawatts are
15 we talking about?

16 A. I don't have anything here to do that
17 with me.

18 Q. Will you undertake to provide that?

19 A. Yes. What pressure would you like?

20 Q. 20,000 pounds.

21 That's 322...

22 THE REGISTRAR: .9.

23 THE CHAIRMAN: Do you have a rough idea
24 of what that might be? I won't hold you to it, but do
25 you have a rough idea of what that might be?

1 MR. BROWN: I am not sure right now.

2 ---UNDERTAKING NO. 322.9: Ontario Hydro undertakes to
3 provide the total megawatts of
4 thermally-matched project with a load of
20,000 pounds per hour.

5 MR. SHEPHERD: Q. Is it possible for us
6 to have that on Monday morning, or by Monday morning?

7 MR. BROWN: A. I will try to get that by
8 then.

9 Q. Thank you.

10 Do you have any of the proposals before
11 you, the ones that aren't thermally matched that are
12 sites that weren't on Leighton and Kidd because the
13 steam load was too small?

14 A. I can't describe it in terms of size.
15 We have a list of Leighton and Kidd sites and these
16 just were not on the list. From that I can't determine
17 if it's a new steam load or it was existing in the
18 past.

19 Q. Let me rephrase the question. Are
20 any of the projects that we have been talking about
21 that are not thermally matched, do any of them have a
22 steam load of less than 40,000 pounds?

23 A. I don't know if I have that
24 information.

25 Q. Could you find that out for us?

1 A. If the proponent has provided me with
2 that information, I might be able to provide it to you.

3 Q. Okay. But typically they would
4 provide with you the heat load; wouldn't they?

5 A. Certain ones on the various stages of
6 negotiation. You are talking about the 1000 megawatts?

7 Q. That is fine. Sure.

8 THE CHAIRMAN: I think we are talking
9 about proposals that you have on your desk or however
10 you stack them up. Is that not what you're talking
11 about?

12 MR. SHEPHERD: Yes.

13 Q. The ones that you have already told
14 us you have made a determination as to how badly they
15 are mismatched thermally, obviously you must know what
16 the thermal load is; right?

17 MR. BROWN: A. Yes.

18 Q. So you can look through that list and
19 tell us whether any of them are under 40,000?

20 A. We are talking about the new ones
21 that weren't on the list. I will try and attempt to
22 determine which ones are less than 40,000. Is that
23 what you are looking for?

24 Q. That is fine. All right. Sure.

25 THE CHAIRMAN: Do we need a number for

1 that?

2 THE REGISTRAR: 322.10.

3 ---UNDERTAKING NO. 322.10: Ontario Hydro undertakes to
4 provide any sites now put forward that
5 weren't in the Leighton and Kidd study
before because they were considered too
small.

6 [3:05 p.m.]

7 MR. SHEPHERD: Q. Okay. Let's turn to
8 institutional, commercial and residential, Mr. Brown.
9 Still talking just technical potential now and, again,
10 if you want to look at the chart on page 4 of Exhibit
11 326, the number you have used is 6,200; isn't it?

12 MR. BROWN: A. That's correct.

13 Q. This is hospitals and universities
14 and schools, hotels, office buildings, shopping malls,
15 et cetera, that sort of thing?

16 A. Yes.

17 Q. And in the 1990 NUG plan, I think in
18 your evidence too, you said -- maybe I better get it
19 out. On page 2 of the 1990 NUG plan which is, sorry,
20 Exhibit 83, you say in the third paragraph:

21 "Due to the limited amount of activity
22 expected in these sectors, Ontario Hydro
23 has not attempted to estimate the
24 technical potential."

25 And then you go on to say you use the

1 6,200 megawatt number from Acres International.

2 So should I read that as saying that the
3 technical potential figure you're using is not one
4 you're really comfortable with?

5 A. No. As I said in my evidence, this
6 is the best available information at the time.

7 Q. All right. But you think that the
8 6,200 megawatts is right?

9 A. It's a pretty good calculation.

10 Q. Is it fair to say that when the Acres
11 study was done, there were fairly severe restrictions
12 put on the parameters of the study itself in this
13 sector?

14 A. Such as...?

15 Q. Well, parameters as to what the
16 people doing the study were supposed to look at, what
17 assumptions they were supposed to make with respect to
18 technology, et cetera?

19 A. I don't think that is in the report.
20 The report has a lot of parameters that are used to
21 calculate the number.

22 Q. Okay. Have you looked at those
23 parameters to see whether you are comfortable with
24 them?

25 A. In 1987 they were pretty good

1 parameters.

2 Q. You're using this number today;
3 correct?

4 A. That's correct.

5 Q. And I'm just trying to recall, wasn't
6 one of those parameters that they had to assume steam
7 turbines?

8 A. In some sectors, yes.

9 Q. Okay. And of course --

10 A. That was more in the industrial
11 sector.

12 Q. Oh, that was in the industrial, okay.
13 Now, you are not so much concerned, I guess, about this
14 number because of the economics; right?

15 A. We have focused our information so
16 far on the industrial side.

17 Q. If the economics change though, this
18 figure becomes pretty important; doesn't it, this
19 technical potential for this sector?

20 A. That's true.

21 Q. Is it true that -- sorry, go ahead.

22 A. I'm just finding the Acre's study.

23 Q. Okay. Is it true that when we talk
24 about the economics for this sector changing, we're
25 primarily talking not about buy-back rates, the prices

1 you pay for independent power, or avoided costs, we're
2 primarily talking about customer rates; right?

3 A. These are primarily load
4 displacement, that's correct.

5 Q. So if we see large increases in
6 customer rates, is it true that that will affect the
7 economics of this sector?

8 A. That's one of the variables.

9 Q. Is it a substantial variable?

10 A. Depends on your long-term outlook on
11 electricity prices not just an annual value.

12 Q. Well, we've seen I guess in the last
13 couple of years electricity prices rise, I don't know
14 what, a total of 10 or 12 per cent above inflation in
15 the last couple of years; is that --

16 A. Cumulative?

17 Q. Am I in the right range?

18 A. I can't comment on that.

19 Q. Mr. Snelson, you must have some
20 general knowledge of the prices?

21 THE CHAIRMAN: An increase in rates, I
22 think we know that.

23 MR. SHEPHERD: Q. Okay. And we have
24 also seen that there have been recent announcements
25 that there are going to be further large increases in

1 the next couple of years; isn't that correct?

2 MR. B. CAMPBELL: Well, I'm sorry. I
3 think the evidence on this has been pretty clear, in
4 that there were increases in the forecast generally.

5 I think Mr. Burke spoke several times to
6 the fact that: Well, yes, the nominal increases had
7 gone up.

8 There had been a certain amount of real
9 increase allowed for already in his forecast. I'm not
10 going to try and give any numbers because I don't
11 remember any.

12 But I think Mr. Burke did address this
13 several times during the course of his testimony as to,
14 in real price terms, what the actual changes that were
15 being discussed, where they fit in relation to what was
16 forecast.

17 MR. SHEPHERD: I didn't ask anything
18 about the forecast Mr. Campbell.

19 MR. B. CAMPBELL: Well --

20 THE CHAIRMAN: What we may be aiming
21 towards is whether or not given the change in this
22 variable and the forecast of the change of this
23 variable, should the 85 megawatt number be
24 reconsidered. I guess that's what we're coming to.

25 MR. SHEPHERD: Well, actually later I do

1 want to talk about that, but that's not what I want to
2 talk about right now, Mr. Chairman, unless you do.

3 THE CHAIRMAN: All right.

4 MR. SHEPHERD: Q. What I'm really
5 concerned with is, if because of changes in prices,
6 because of Hydro's forecasts of changes in prices
7 there's a change in the economics, am I right in
8 assuming that you've got to go back and look at that
9 technical potential number for industrial, commercial
10 and residential and get more rigorous information?

11 MR. BROWN: A. That is just one variable
12 that's going to improve the economics. You have to
13 look at the capital costs, the gas costs, the ability
14 of people to accept these machines, because now they're
15 not buying electricity they have to run a piece of
16 equipment, and the use of that equipment longer than
17 just heating.

18 Gas is -- sorry, electricity prices are
19 one of the components. It is not separate though from
20 avoided cost, he still has to worry about back-up power
21 and some other issues.

22 Q. But the other major factor would be
23 gas prices; wouldn't it?

24 A. Did I not mention that. I'm sorry.
25 Gas is important.

1 Q. And haven't gas prices been moving
2 the other direction from electricity prices, so that
3 that would make the economics even better?

4 A. Yes, the economics is improving, I'm
5 not arguing with that.

6 Q. Okay. So what plans do you have at
7 present to review and do some study or analysis to work
8 on that 6,200 number?

9 A. We have been discussing with gas
10 companies on trying to get better information.

11 Q. Isn't it true in fact that -- and if
12 we're just thinking in the technical, the pure
13 technical potential sense, wouldn't we get a pretty
14 good sense for non-industrial cogeneration, ignoring
15 economics, just by looking at the space and water
16 heating data for the Province of Ontario, which Ontario
17 Hydro already collects and analyzes?

18 A. That would have a portion of
19 electricity, as well heating. You're talking about
20 application where you have to use gas.

21 Q. Yes, but that's also collected by
22 Ontario Hydro already; isn't it?

23 Haven't we heard a whole lot of evidence
24 on space heating and water heating and what percentage
25 is this and that and where it is and everything. It's

1 all data Hydro's collected; isn't it?

2 MR. VYROSTKO: A. Yes, that data that
3 Hydro collects.

4 Q. And if we wanted to calculate
5 technical potential, we could just take that data and
6 it's math after that; isn't it?

7 MR. BROWN: A. I don't know if it's a
8 straight conversion from that information. I have to
9 see it.

10 Q. Okay. You never attempted to use
11 that information to calculate technical potential; have
12 you?

13 A. As I mentioned, our focus today has
14 been on the industrial side. This number is not used
15 to calculate our attainable potential at present.

16 Q. Understood. Well, one other thing
17 caught my eye in that 1990 NUG plan on page 2, just
18 while we're there, maybe I can turn to it.

19 We talked yesterday about small packaged
20 cogen, basically like sort of oversized car engines
21 almost; isn't it?

22 A. Some of them are, yes.

23 Q. Yes. And you say in the third line
24 on page 2 of Exhibit 83:

25 "Other thermal loads such as hot water

1 can be produced by small packaged
2 cogeneration units, however, the
3 economics of these units is still not
4 favourable."

5 And I take it that you concluded from
6 that that you couldn't include any component in your
7 achievable potential for that category?

8 A. That's not true.

9 Q. Oh, you do have some small packaged
10 cogen assumed in there?

11 A. Yes, and there's some in our 731
12 megawatts.

13 Q. Okay. How much of your 85 megawatts
14 is small packaged cogen?

15 A. Over 20 megawatts.

16 Q. Over 20 megawatts?

17 A. By the year 2000.

18 Q. And that was in there last year, the
19 85 hasn't changed?

20 A. That's right.

21 Q. I think probably for simplicity I'm
22 going to skip over to that part and -- if I can find
23 it. The 1990 NUG plan projects 85 megawatts of
24 cogeneration in this sector achievable; right,
25 institutional, commercial and residential achievable is

1 85 megawatts?

2 A. You're on page 7?

3 Q. Actually I'm on my slide, but...

4 A. Yes, by the year 2000, 85 megawatts.

5 Q. 85 megawatts. And that number is
6 unchanged this year?

7 A. The preliminary indication is it
8 hasn't increased that much. We haven't -- we are still
9 looking at some of these sectors.

10 Q. Your supplementary witness statement
11 does say it's unchanged; doesn't it?

12 A. In our preliminary forecasts, yes.

13 Q. Okay. Now, of that 85 megawatts, is
14 it correct to say that 68 megawatts is the Ottawa
15 Health Sciences Centre project?

16 A. That's correct.

17 Q. So now we have 17 -- my calculation,
18 17 megawatts left for everything else, including what
19 you've already got and what you expect to get by the
20 year 2000; is that right?

21 A. That's correct.

22 Q. And how much else do you already
23 have?

24 A. That's included in those numbers,
25 it's very small, less than a megawatt I believe.

1 Q. Okay.

2 A. A lot of projects, they're all small.

3 Q. So you're not going to have 20
4 megawatts of small packaged cogen, it's going to be 17
5 megawatts.

6 A. (shrugging)

7 Q. Okay. Included in that 17 megawatts
8 are Etobicoke Olympium and Westbrook Greenhouses?

9 A. Yes.

10 Q. And they're a megawatt together;
11 right, something like that? It's not really important
12 whether it's a megawatt or 800 kilowatts or 1.2, it
13 doesn't matter.

14 A. Etobicoke Olympium is 250 kilowatts
15 and the Westbrook Greenhouse is 550 kilowatts.

16 Q. So --

17 A. It's less than a megawatt.

18 Q. So 800 kilowatts. Okay. Back to
19 where I was. You've said in your supplementary witness
20 statement on page - that is Exhibit 319 - on page 5 --
21 now I can't find it. Oh, here we are.

22 In paragraph 18, it says one of the
23 programs you have currently under development is a
24 small packaged cogeneration program to streamline the
25 approval process for providing financial assistance to

1 small cogeneration projects.

2 And now that wasn't planned last year;
3 was it?

4 A. Oh, we had it on our books we hadn't
5 done any work on it, no.

6 Q. When you assumed that you would get
7 16 or 17 megawatts of small packaged cogen, was that
8 assuming that you would have a program like this in
9 place sooner or later?

10 A. All these projects come in now and
11 are allowed to obtain funding through our financial
12 assistance program.

13 [3:20 p.m.]

14 The small package cogeneration program is
15 just to speed up more in our office than outside.

16 Q. So you don't expect to get any more
17 megawatts from it?

18 A. No information on it. I am hoping we
19 will. That's why I am doing the program.

20 Q. The last area is gas compressors. I
21 just want to clear up -- and if you take a look at page
22 4 of Exhibit 326, it doesn't say this explicitly in
23 your supplementary witness statement, but we have
24 assumed that the technical potential for gas
25 compressors has increased from 300 to 540; is that

1 correct?

2 A. I believe it would be larger than
3 that.

4 Q. Well, is it even higher?

5 A. Yes.

6 Q. Okay. There is one other little
7 thing I just want to clear up. We had confusion the
8 other day between gas compressors and turbo expanders.
9 They're different; right?

10 A. Yes. One is combusting natural gas;
11 the other one is a flow-through of natural gas.

12 Q. So where in the 1990 NUG plan on page
13 4 it has a chart at the bottom - paragraph 1.4 of
14 Exhibit A3 - it has under "Cogeneration, Gas
15 Compressors, Turbo Expanders - 300", and then below
16 that it has "Turbo Expanders - 30", that's just a typo,
17 is it?

18 A. That's correct.

19 Q. Okay. 1990 was the first year you
20 estimated a number for gas compressors? You have given
21 evidence as to that?

22 A. Yes.

23 Q. And the reason you did so is that
24 developers started coming to you with proposals?

25 A. This technology is a function of gas

1 price, and as gas prices were dropping they started
2 showing up on our door. We now recognize them as a
3 potential NUG technology and they are now being
4 included.

5 Q. Have you included anything more in
6 this technical potential than simply the numbers and
7 the proposals that have been provided to you?

8 A. The number in the 1990 NUG plan is
9 based on project proposal information, and at that time
10 it was essentially the efficient size.

11 Q. And the new number of, whatever it
12 is -- it's not 540, but whatever it is that's also
13 based on proposals; correct?

14 A. That's correct.

15 Q. So you haven't actually gone out and
16 seen how many gas compressors there are out there, or
17 how big they are, or what you could do with them?

18 A. We have that information from the
19 proponent.

20 Q. So you are making the assumption that
21 every gas compressor you have had a proposal on
22 already?

23 A. We leave it up to him to determine
24 which ones have potential for this technology.

25 Q. No, we are talking technical

1 potential here.

2 A. No, I am talking technical potential,
3 too. There are, I believe, some locations that it's
4 not possible to do this.

5 Q. You don't actually have a list of the
6 gas compressors around, all of them?

7 A. They're on a map. The TransCanada
8 PipeLine map has all compressor stations marked on it.

9 Q. And the total technical potential, if
10 you like, how many megawatts you could create from
11 those gas compressors, all of them, absent economics
12 and environmental considerations, it's not those
13 numbers, is it?

14 A. It might be slightly higher than
15 this.

16 Q. Let's move to achievable potential,
17 then.

18 Your estimates in the 1990 NUG plan of
19 achievable potential, they are based primarily on your
20 spreadsheet analysis; correct?

21 A. For the industrial cogeneration
22 section.

23 Q. Sorry, I should have read my heading
24 here, "Industrial Cogeneration". And those are the
25 spread sheets we looked at earlier which have now been

1 corrected?

2 A. In Exhibit 143.

3 Q. Yes. Okay. Will you take a look
4 at -- maybe I should get out Exhibit 143, if I could
5 find it. Bear with me just a second. I have to go
6 back to Exhibit 83.

7 I don't think this point is different
8 from these spread sheets to the new ones, so I will
9 refer to Exhibit 83, Table A3.7.

10 THE CHAIRMAN: Page 7?

11 MR. SHEPHERD: No, Table A3.7. It's
12 actually page 42 of Exhibit 83.

13 Q. Do you have that, Mr. Brown?

14 MR. BROWN: A. Okay.

15 Q. Okay? And there you have an
16 assumption in the upper lefthand box, at the bottom of
17 the upper lefthand box it says:

18 Fuel chargeable to power rate, 4,800

19 Btu per kilowatthour.

20 That is the heat rate you are assuming; right?

21 A. Yes.

22 Q. You are assuming 4,800 Btu?

23 A. Yes, high efficiency.

24 Q. And that's true of all the spread
25 sheets you have done for cogeneration; correct?

1 A. That are in the NUG plan, yes.

2 Q. And the spread sheets you have in 143
3 in front of you, do they also assume 4,800?

4 A. Yes, they do.

5 Q. Okay. And is it correct to say that
6 the lower the heat rate, all other things being equal,
7 the higher the revenues from the project relative to
8 fuel costs?

9 A. If all other parameters are fixed and
10 you lower the heat rate, then the fuel costs will go
11 down and increase the revenue.

12 Q. And that would mean the return on
13 equity and the internal rate of return would both
14 increase?

15 A. That is correct, under those same
16 assumptions.

17 Q. Now, we determined, I think, that all
18 three of you are engineers. Do any of you have
19 experience actually in the cogeneration area, hands-on
20 experience?

21 MR. SNELSON: A. No.

22 Q. Well, I will try the question anyway.
23 Is it fair to say that the heat rate of 4,800 is
24 extremely low?

25 MR. BROWN: A. I believe in the NUG plan

1 that is qualified by saying this is a number used over
2 a 25 year period, and we are assuming some technical
3 improvements. There are machines that are at this area
4 now, although on average they are probably over 5,000.

5 Q. In fact, you don't have any project
6 proposals in front of you right now in-service,
7 committed, or proposed at a 4,800 heat rate, do you?

8 A. We have some less.

9 Q. You have some less? Could you tell
10 us which ones they are?

11 A. I am aware of one. You have already
12 mentioned it, the Westbrook Greenhouse.

13 Q. And what was that, 550 kilowatt?

14 A. Yes.

15 Q. And that's a pretty specialized
16 application, isn't it? The heat loads are pretty
17 specialized? Heat load?

18 A. No, it's a packaged unit. It could
19 have went anywhere.

20 Q. Okay. Is it fair to say that most
21 engineers would consider a 4,800 Btu per kilowatthour
22 heat rate to be a very low rate for cogen even if it
23 was well designed?

24 A. Well, the absolute best you can do is
25 3,414. This is above that. Most proposals we are

1 getting aren't at this level.

2 But you must remember I am trying to
3 forecast for 25 years. So at this time this is a very
4 good number.

5 Q. But you use 4,800 in your 1995 spread
6 sheet, too; right?

7 A. That's correct.

8 Q. That's not 25 years from now?

9 A. No, that's right.

10 Q. Could you turn up Interrogatory
11 5.14.152, please?

12 THE REGISTRAR: 321.19.

13 ---EXHIBIT NO. 321.19: Interrogatory No. 5.14.152.

14 MR. SHEPHERD: Q. This is a question
15 about your 6,000 Btu test for the preference set. Your
16 answer is:

17 As shown on page 16 of Exhibit 85,
18 the 6,000 Btu per kilowatthour was
19 considered to correspond to the heat rate
20 of a well designed cogeneration
21 facility...,
22 which would receive the full 10 per cent premium. So
23 is it fair to say that a well designed cogeneration
24 facility should be running around 6,000?

25 MR. BROWN: A. I have the interrogatory.

1 Q. My question was: Is it correct to
2 say the heat rate for a well designed cogeneration
3 facility is in the 6,000 range?

4 A. At this time a good design would be
5 6,000 as well as 4,800.

6 Q. No, no.

7 A. But cogeneration is a variable and
8 when we define efficiency in another interrogatory the
9 Leighton and Kidd data was based on about 5,200, 5,400.

10 Q. Okay. But --

11 THE CHAIRMAN: When do you start taking
12 points off the 10 per cent?

13 MR. BROWN: At 6,000. As it goes above
14 6,000 it starts losing from the 10 per cent adder.

15 THE CHAIRMAN: So up to 6,000 it's well
16 designed, is that what you are saying?

17 MR. BROWN: Yes, we are.

18 MR. SHEPHERD: Q. Okay. Perhaps you
19 could turn up Interrogatory 5.14.200, and this has a
20 whole lot of spread sheets attached to it, which
21 thankfully I won't ask anybody to look at, but on the
22 first page of the answer it does an --

23 THE CHAIRMAN: Give this a number?

24 MR. SHEPHERD: I'm sorry.

25 THE REGISTRAR: What is the number, Mr.

1 Chairman?

2 THE CHAIRMAN: It's 5.14.200.

3 THE REGISTRAR: 200. Thank you. 321.20.

4 ---EXHIBIT NO. 321.20: Interrogatory 5.14.200.

5 MR. SHEPHERD: Q. In this interrogatory
6 answer Ontario Hydro calculated the economic potential.
7 Among other things, it calculated the economic
8 potential at a heat rate of 6,000.

9 And the last paragraph of this says --
10 referring to 6,000, it says:

11 Unless a lower rate of return is
12 accepted or economies of scale, lowering
13 the capital cost are achieved, the impact
14 of this analysis lowers the achievable
15 cogeneration potential to near zero.

16 Is it fair to say that if every project
17 that came in to you -- or at least at the time this was
18 written, June 7th, with the information you had then,
19 every project that came in to you was well designed at
20 6,000 heat rate, that you would assume that they would
21 not go ahead, they would not be successful?

22 MR. BROWN: A. I believe that is in this
23 interrogatory --

24 THE CHAIRMAN: I don't follow that
25 question, I'm sorry. I missed it. Could you please

1 repeat the question? I am not quite sure what you
2 mean.

3 MR. SHEPHERD: Yes. The interrogatory
4 refers to attached spread sheets which Ontario Hydro
5 says are recalculations of project economics based on a
6 6,000 heat rate.

7 THE CHAIRMAN: Yes?

8 MR. SHEPHERD: And the last paragraph
9 says:

10 Unless a lower rate of return is
11 accepted or economies of scale --

12 THE CHAIRMAN: Where are you reading that
13 from?

14 MR. SHEPHERD: This is the last paragraph
15 of the first page of 5.14.200.

16 THE CHAIRMAN: Oh, I see. All right.
17 Thank you.

18 [3:35 p.m.]

19 MR. SHEPHERD: Q. Unless a lower rate of
20 return is accepted or economies of scale,
21 lowering the capital costs are achieved,
22 the impact of this analysis lowers the
23 achievable cogeneration potential to the
24 near zero.

25 The problem I am having is, you give the

1 full 10 per cent adder for cogeneration facilities that
2 have a 6,000 heat rate, and you refer to a cogeneration
3 facility like that as being a well designed facility,
4 and yet you tell us that at that heat rate we won't get
5 any, that it has to be much lower. I don't understand.
6 Could you explain?

7 MR. BROWN: A. Based on the information
8 that's in that spreadsheet, that's what it's telling.

9 Q. Is that still true?

10 A. For the 1990 NUG plan.

11 Q. No, I am not asking whether it was
12 true in 1990. I am asking whether it's true now.

13 A. We have a new gas forecast now, so
14 these studies have not been redone.

15 Q. Okay. Is it still your assumption
16 that unless a cogeneration facility can get down to
17 heat rates in the 4,800, 4,900, 5,000 range, there will
18 be no achievable potential?

19 A. I haven't done those studies. This
20 study back in 1990 indicates that.

21 Q. Okay. The other part of your
22 methodology in this area, as I understand it, is
23 extrapolation from past data; right?

24 A. That's correct.

25 Q. If we take a look at Exhibit 83, page

1 5, it seems to say there, in the fifth paragraph,
2 correct me if I am wrong in my understanding, that you
3 have taken 114 megawatts of new projects over the years
4 '88, and '89, calculate that that represents 5 per cent
5 of technical potential annually, and applied that to
6 the five years, 1991 to 1995. Let me just stop there.
7 Is that the first part of what you did?

8 A. What we are trying to do here is we
9 know what the year 2000 number is. We are using this
10 information to determine the timing of cogeneration
11 over that period. So, this information is used to
12 determine what part of the attainable potential will
13 happen in the first five years, and to do that we do
14 use the two years of past growth.

15 Q. I am going to come back to how you
16 know what the number is going to be in the year 2000 in
17 a second. But first, so you take two years' data and
18 extrapolate from that to five years' projections;
19 correct?

20 A. Yes.

21 Q. Okay. I guess first, from your
22 knowledge of trend analysis, is two years sufficient
23 data from which to determine a trend or a forecast?

24 A. That's all the information we have in
25 Ontario.

1 Q. Mr. Snelson, you are more
2 knowledgeable in this area, aren't you? If you have
3 two years of data, can you forecast five years in the
4 future?

5 MR. SNELSON: A. I couldn't particularly
6 comment, obviously the more years of data you have got,
7 then the more reliable your forecasts, but apart from
8 that generality I couldn't add anything.

9 Q. Mr. Snelson, maybe you are not
10 familiar enough with the area, please say so if you
11 aren't.

12 I had understood that there were actually
13 some statistical calculations you could do to determine
14 whether your forecast had any statistical significance;
15 isn't that right?

16 A. There are statistical tests of
17 significance, and I am not a statistician, so I
18 wouldn't comment on that. If you had such tests they
19 would be to determine the degree of confidence you
20 could put in your forecast.

21 Q. The extent to which the forecast is
22 more reliable than random numbers, is that correct?

23 A. The statisticians make some
24 assumptions about what sort of populations they are
25 drawing from, and this is where I get out of my depth

1 and I couldn't particularly comment further.

2 Q. Now, again, Mr. Brown, then as I
3 understand it for the period 1996 to 2000, you have
4 doubled the penetration rate to 10 per cent of
5 technical potential per year; correct.

6 MR. BROWN: A. That's right?

7 Q. And that's right on the theory that
8 economics for the projects would be improving?

9 A. Yes.

10 Q. And that's based on spreadsheets that
11 said that they were wrong; correct?

12 A. That's correct.

13 Q. And the new spreadsheets don't say
14 that project economics improve?

15 A. That's right. They are essentially
16 the same.

17 Q. So, the 10 per cent should be wrong
18 then, correct?

19 A. What we should have done in our
20 revision is straight-lined it over the ten year period
21 rather than trying to put it all at the back end.

22 Q. Okay. Now, when I read this analysis
23 here on page 5 of Exhibit 83 -- let me backtrack.

24 You just said a minute ago, as I
25 understand it, you already had the year 2000 number and

1 all you were doing is trying to split it up between the
2 years; correct?

3 A. We have a rough idea which is already
4 on page 5, 1,326, and we are trying to work to a number
5 that's in that area. The number we got was 1,250. So
6 it didn't split it up perfectly.

7 Q. Well, sorry, this is brand new. I
8 didn't realize this.

9 As I read that paragraph it says that
10 projects have to have a steam capacity factor in excess
11 of 70 per cent to be economic.

12 A. That was a result of our spreadsheet
13 analysis.

14 Q. Okay. And the sites in that group
15 totalled 1,326 megawatts?

16 A. That's correct.

17 Q. And then you said, it looks like you
18 are saying, now we had to figure how much of that will
19 we get and to do that we looked at how much we got in
20 the last two years; isn't that what this says?

21 A. No, it's more trying to determine
22 timing rather than how much.

23 Q. It doesn't say that there.

24 A. I will correct that in the 1991 NUG
25 plan.

1 Q. Okay. So then I take it that you
2 started out this process in 1990 saying any site that
3 has over 70 per cent steam capacity factor is going to
4 be in-service by the year 2000?

5 A. Yes.

6 Q. And then you said, okay, now let's do
7 another calculation to see how we would get there, and
8 then you use the number from that other calculation as
9 your projection?

10 A. We use the over 70 per cent number as
11 our long-term projection.

12 Q. The 1,326?

13 A. Yes.

14 Q. Okay. But you just said a minute ago
15 that you knew what the number was for 2000, all you
16 were trying to do was split it up. How did you know
17 what the number was for the year 2000?

18 A. Using our spreadsheet analysis we
19 determined what was economic, what we believed to be an
20 economic site, and an economic site by using the
21 spreadsheets was somebody that had a steam capacity
22 factor of greater than 70 per cent and they represented
23 over 1,300 megawatts of the potential.

24 Q. That's the 1,326?

25 A. Right.

1 Q. So why didn't you just use the 1,326
2 for the year 2000?

3 A. Well, when we do the NUG plan, it's
4 not one number we are looking for, we have to provide
5 annual numbers. So a derivation of those numbers is
6 what this is all about.

7 Q. But we have agreed, haven't we, that
8 your method for splitting it up for over the years, the
9 numbers you got there were based on faulty information?

10 A. The five and the ten were.

11 Q. But that's the number you used. You
12 didn't use 1,326, did you?

13 A. The five and the ten were applied on
14 the 1,326.

15 Q. Yes. The number for the year 2000
16 comes from that five and ten; right?

17 A. Yes.

18 Q. And the justification for that five
19 and ten is, you will continue at the same pace for the
20 next five years as the last two years and then our
21 penetration rate will double. That's what it says
22 there; right?

23 A. Yes.

24 Q. And the doubling of the penetration
25 rate was wrong?

1 A. Yes.

2 Q. So then we would have to reduce that
3 to 5 per cent per year?

4 A. No, I don't think we would come up
5 with a different per cent increase.

6 Q. So, you come up with a different
7 rationale for how to do it?

8 A. That's correct.

9 Q. So, you came up with the rationale
10 after the fact?

11 A. Yes.

12 Q. First you decided what number wanted
13 and then you came up with the rationale for how to get
14 there?

15 A. Our methodology is to come up with
16 the year 2000 number first and then figure out how we
17 are going to get there year-by-year.

18 Q. Okay. Now, you just increased your
19 projection for the year 2000 by 550 megawatts; right?

20 A. That's correct.

21 Q. Of that only 410 is the thermal
22 matching problem, the other 140 is just more projects;
23 right?

24 A. Yes.

25 Q. Yet, your new information, if you

1 like, aside from project information, your new
2 information is you have got the spreadsheet right now
3 and the new spreadsheet shows much more poorer project
4 economics; correct?

5 A. We haven't done a spreadsheet.

6 Q. You corrected last year's
7 spreadsheets and instead of showing a 25 per cent
8 internal rate of return, they now show 14; isn't that
9 right?

10 A. That's correct.

11 Q. That's a big difference; isn't it?

12 A. Yes.

13 Q. So, I would have thought that would
14 push your projection down somewhat.

15 A. I think what is important is to
16 figure out why the changes were made, and the
17 spreadsheets were updated for, one, because of a
18 mathematical error on the spreadsheet, and, No. 2, that
19 we forget to incorporate financial equity into these
20 spreadsheets. And using our old methodology we would
21 never have forecasted anything because we are
22 assuming 100 per cent equity. We have now changed that
23 in the errata saying we are looking for prefinancing
24 rates of return around 11 per cent.

25 Q. Isn't it true that you determined the

1 percentage that you would say you were looking for
2 after you are did the spreadsheets to see what
3 percentage came out?

4 A. We had to determine the 11 based on
5 looking at a debt ratio to get us in 15 to 20 per cent
6 range.

7 Q. Your new number of 1,800 megawatts,
8 that's not based on spreadsheets anymore, is it?

9 A. That is a preliminary number. We
10 haven't done the spreadsheets, but they will be done to
11 support that number.

12 Q. So you are going to do new
13 spreadsheets for that?

14 A. Yes.

15 Q. And you are anticipating that those
16 spreadsheets will produce a number of 1,800 megawatts?

17 A. The 1,800 is based on project
18 information which I don't need a spreadsheet to figure
19 that out.

20 Sorry, there is a large component in the
21 1,800 which is based on project information. The
22 additional component which I have to determine using a
23 spreadsheet I haven't determined yet.

24 Q. You haven't actually changed, in the
25 number we have before us, the 1,800 megawatts, you

1 haven't changed that additional component at all, have
2 you?

3 A. The 1990 NUG plan hasn't changed. It
4 was just an addition because of the major supply
5 component, the low-efficiency cogenerators.

6 Q. So when you redo your economic
7 analysis with today's gas prices and today's avoided
8 costs, both of which have improved the economics of
9 cogeneration; correct?

10 A. Yes.

11 Q. Can I take it that the portion of
12 this 1,800 megawatts that is not current projects is
13 going to have to increase, you are going to show
14 improved economics; right?

15 A. There will be an increase.

16 Q. Which will mean an increase in the
17 3,100 megawatts?

18 A. That's already factored into it.

19 Q. No, no. The 1,800 megawatts, tell me
20 if this is it right, maybe I am just misunderstanding.
21 The 1,800 megawatts has two parts to it. It has
22 projects you know about and that's what, 1,000 of it?

23 A. In the industrial sector or just...

24 Q. Industrial. 1,800 megawatts is the
25 industrial number?

1 A. It's around that number.

2 Q. So you have got a 1,000 you know
3 about?

4 A. Right.

5 Q. All right. And that we don't know
6 need to worry about, it's projects, they exist. You
7 have already assessed whether they are going to happen
8 or not. Then you have got another 800 megawatts
9 which --

10 A. There is already some in-service too.

11 Q. Sorry, the 1,000 includes ones that
12 are in-service, or it doesn't?

13 A. No.

14 Q. All right. So, we have got 1,800
15 megawatts. We have three components now. In-service,
16 how much is that?

17 A. 178.

18 Q. And then the total of committed and
19 proposed that you are treating as in that number is
20 about 1,000?

21 A. 1,200.

22 Q. 1,200.

23 So then you have another 200 and --
24 sorry, 422 megawatts, which is projects you don't know
25 about that is your forecast that will happen?

1 A. Yes.

2 Q. Correct?

3 A. That's correct.

4 Q. And that's the same number as you had
5 last year?

6 [3:52 p.m.]

7 A. For that time period, yes, probably.

8 Q. Okay. But now you've agreed that if
9 you do the spreadsheets again right now with higher
10 avoided costs and lower gas prices, the project
11 economics should improve; correct?

12 A. Well, the change is not that big.
13 Remember the gas forecasts after about year 2004 starts
14 getting higher, so for the year 1995 in-service in year
15 2000 you could say gas has increased.

16 The avoided costs right now may be higher
17 than last year, but that could decrease as we show this
18 surplus capacity over year 2000, period.

19 Q. Didn't we hear you say that the drop
20 in gas prices was so much you got an extra thousand
21 megawatts, in fact more, 1,200 megawatts?

22 A. That's happening right now. My plan
23 is long term.

24 Q. Okay. So the gas prices are going to
25 shift back the other way and that advantage won't exist

1 any more?

2 A. That's what's in the forecast, yes.

3 Q. Okay. So you think the 422 megawatts
4 will change, you think there will be a change in
5 economics or not?

6 A. I think it will increase slightly but
7 not significantly.

8 Q. Okay. And so when that changes, then
9 the 3,100 megawatts will change?

10 A. When we do the 1991 plan, yes, we
11 will incorporate that.

12 Q. Okay. So we can expect to see a
13 number then in the 1991 NUG plan that's higher than
14 3,100 megawatts; correct?

15 A. Yes.

16 THE CHAIRMAN: That's a big jump from the
17 1,800 down to the bottom line. There may be other
18 adjustments through the peaks.

19 MR. SHEPHERD: I suspect there will be,
20 Mr. Chairman.

21 Q. Now, you currently --

22 THE CHAIRMAN: You expect the 1,800 may
23 change?

24 MR. BROWN: That's correct, but there's
25 changes in other sectors too that are plus and minus.

1 So you're only talking about the 1,800.

2 I'm expecting that will be around that park, maybe
3 slightly higher, but there are other areas that may
4 come down. So overall 3,100 may still be the number.

5 MR. SHEPHERD: Q. Okay. It may be that
6 coincidentally the changes in another one will offset
7 the changes in the cogen?

8 MR. BROWN: A. Like MSW.

9 Q. You can't tell. Okay. Is it true
10 that right now you have currently in-service committed
11 and proposed projects already in front of you or
12 producing in total more than 1,800 megawatts of
13 industrial cogeneration?

14 A. Including proposed, yes.

15 Q. Okay. What is that total in fact,
16 in-service committed and proposed?

17 A. I believe this morning I said I would
18 do an undertaking on that one to provide that
19 information.

20 Q. Oh, I must have been napping. Okay.
21 In any case, your current projections are based on the
22 notion that not only will you not get all of those
23 projects, but you won't get any more; right?

24 A. There could be new ones coming in,
25 but I guess my forecast says we're not going to get all

1 the ones that are currently on the table.

2 Q. Okay. And if you have any new
3 projects come in, they're going to, in effect, have to
4 bump some of the ones that are in front of you now?

5 A. No, I'd try and incorporate it in my
6 forecast.

7 Q. Okay. But project proposals haven't
8 stopped coming in; have they?

9 A. They're coming in, but they're not
10 accepted as proposed projects.

11 Q. Because?

12 MR. VYROSTKO: A. Because, as we
13 explained, we are at the stage now of trying to
14 redefine the preferred non-utility generation projects
15 and now that we're in that stage of trying to develop
16 that, we've basically said that we can't accept any
17 more projects until the time comes when we've got
18 ourselves a definition.

19 Q. So a developer could come to you,
20 let's say, after your cross-examination is over--

21 A. Right.

22 Q. --and say: Here's my project, my
23 heat rate is 4,800 and you're going to say: Sorry, go
24 away?

25 A. If the heat rate is 4,500?

1 Q. 4,800.

2 A. 4,800, I'd probably say I'll look at
3 it.

4 Q. So there's an exception to every
5 rule?

6 THE CHAIRMAN: Let me just understand
7 something. I understand that major supply NUGS will
8 not be included in that column until they're committed,
9 so that you may have proposals on the table for that,
10 but they're not going to be included in the forecast
11 until they're committed; is my understanding correct?

12 MR. BROWN: That's correct.

13 THE CHAIRMAN: But a non-utility major
14 supply NUG which is a preferred NUG that comes to you
15 now as a proposal, would you put it on hold or reject
16 it or suspend it because of this redefinition process
17 you're going through?

18 MR. VYROSTKO: We would pretty well put
19 it on hold. In fact, the intent is there's a meeting
20 on October the 18th where we will be meeting with all
21 the people who have proposals with us or potential
22 proposals and, hopefully, we will be trying to identify
23 what these new regulations or guidelines are.

24 THE CHAIRMAN: So that there may be a
25 whole new criteria for preferred NUGs coming out some

1 time?

2 MR. VYROSTKO: That's correct.

3 MR. SHEPHERD: Mr. Chairman, I'm planning
4 to go to a new topic. I wonder whether it would be
5 appropriate to end there?

6 THE CHAIRMAN: All right. We will
7 adjourn now until Monday morning at ten o'clock.

8 THE REGISTRAR: This hearing will adjourn
9 until Monday morning next at ten o'clock.

10 ---Whereupon the hearing was adjourned at 4:00 p.m., to
11 be reconvened on Monday, October 7th, 1991,
12 commencing at 10:00 a.m.

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